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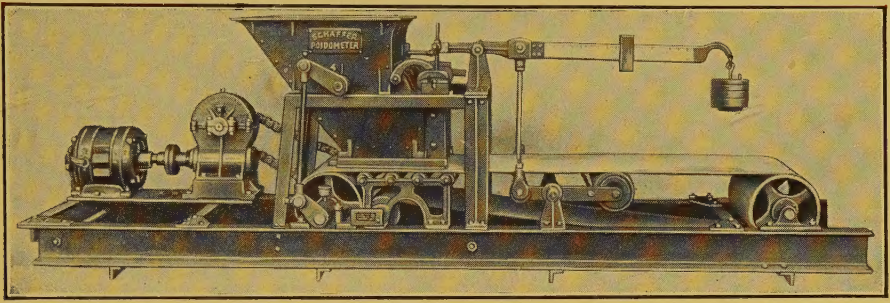

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MILL SECTION of
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The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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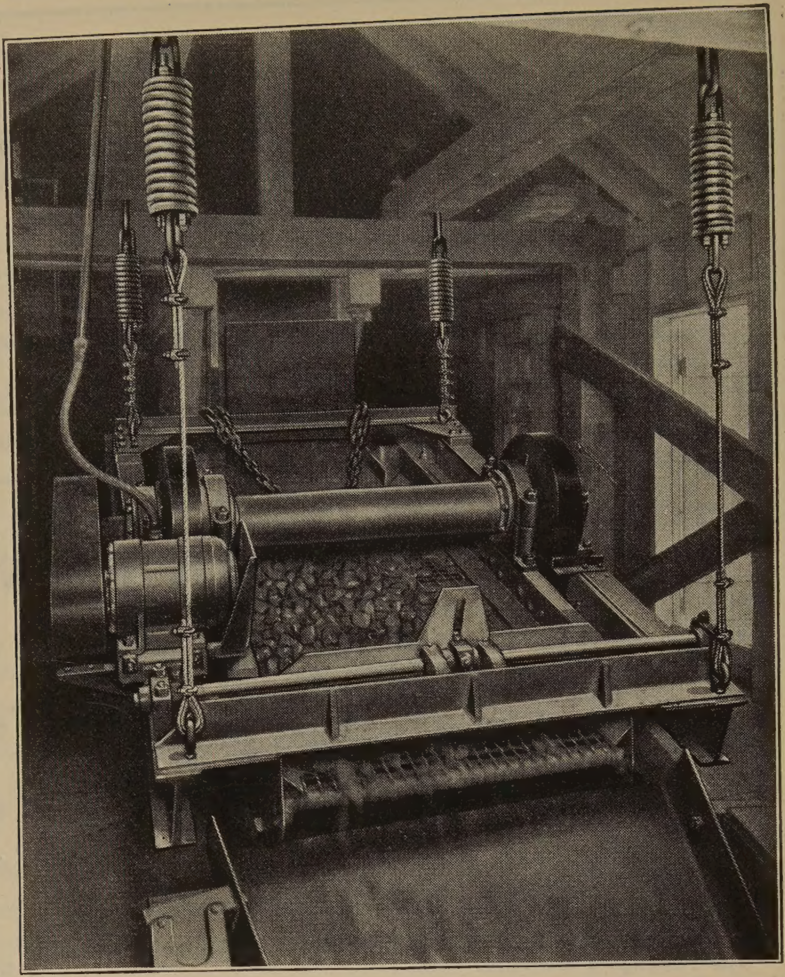

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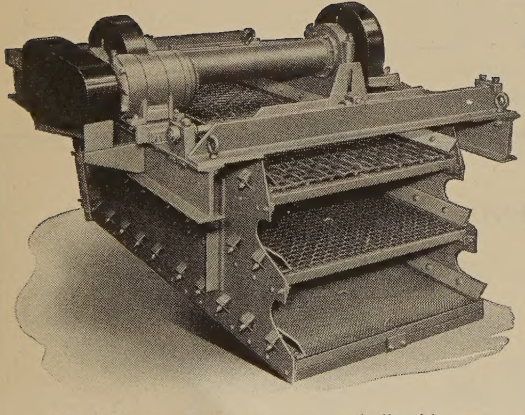

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MILL SECTION of
Concrete

Vol. 37 Chicago, December, 1930 No. 6

Feeding Dry Raw Mix to Kiln at Uniform Rate

Pulverized Coal Fed with Similar Mechanism—Feeder Installation in Michigan Cement Mill Described—Pulverized Materials De-Aerated—Rate of Feeding Measured and Regulated—Flooding Is Overcome

THE importance of uniform feeding of dry pulverized materials in cement mill operation is well known to all operators. The efforts to obtain uniform feeding have constituted major problems for many years. In comparatively recent times definite progress has been made toward a solution of the difficulties, both in the feeding of pulverized coal at the discharge end of rotary kilns, and in the feeding of the pulverized raw mix from the storage bins to the kilns.

Flooding as the Chief Trouble

The desire to overcome flooding was at the bottom of most of the efforts to improve feeding methods, for with the old type of single or double screw conveyors employed for many years, and still employed in numerous mills, flooding is sure to occur. With flooding, uniform burning of the clinker is impossible, for the flow of material can neither be regulated nor measured. In dry process plants where gas or oil is used for burning, the flooding troubles

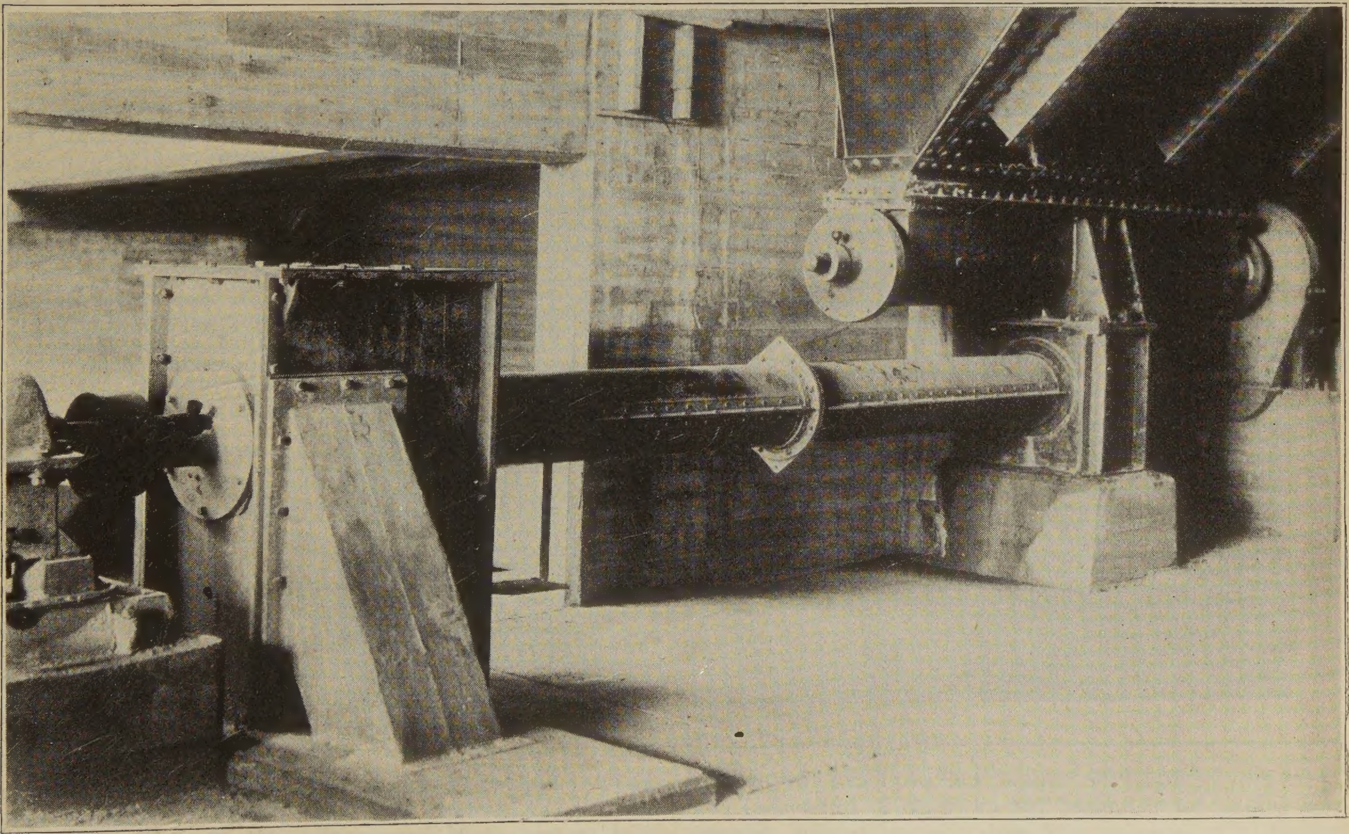

Fig. 1. Feeder for supplying dry raw mix to rotary kilns, as installed at a Michigan cement plant

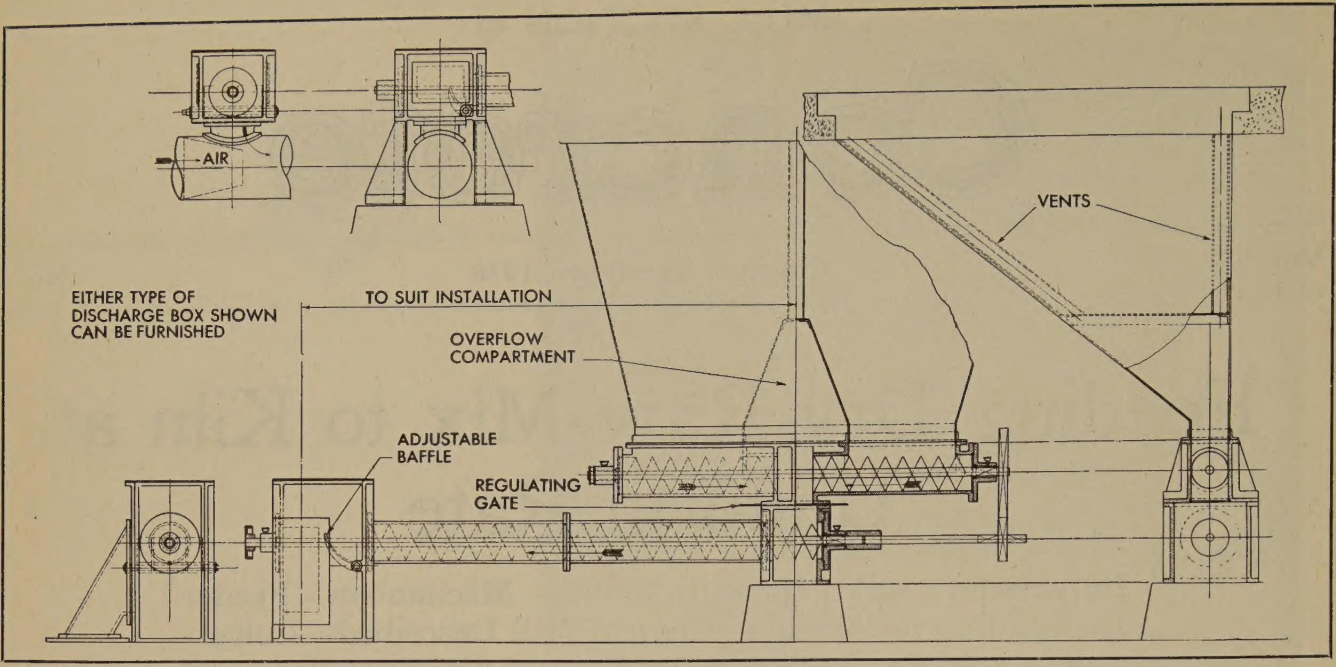

Fig. 2. Mechanical details of raw mix feeder illustrated in Figure 1

are confined to the feeding of the raw mix to the kiln. If pulverized coal is used for burning, the difficulties are doubled. If flooding occurs either in the feeding of fuel or raw mix, all operators know that uniformity in the quality of the finished product can not be maintained.

Some Causes of Flooding

Before the evils of flooding could be overcome it was necessary to study the causes that produced the evil. It was found, for instance, that moisture in pulverized coal caused it to compact and arch over the outlet. Similar arching occurred because of the improper design of the bin bottoms through which the feeders are supplied. Intermittent filling of the storage bins containing the pulverized coal or raw mix aided in producing the troublesome arching over the feeders, for as the bins approached emptiness the arching tendency increased, and when flooding did occur it was worse than when the bins were full. Whatever the immediate cause of arching, when the arch breaks the material rushes down to the feeder, bringing about a flooded condition that means delivery of material at an excessive rate. All finely pulverized material has a high degree of fluidity, so that the effect is much like a sudden rush of water. If the material affected happens

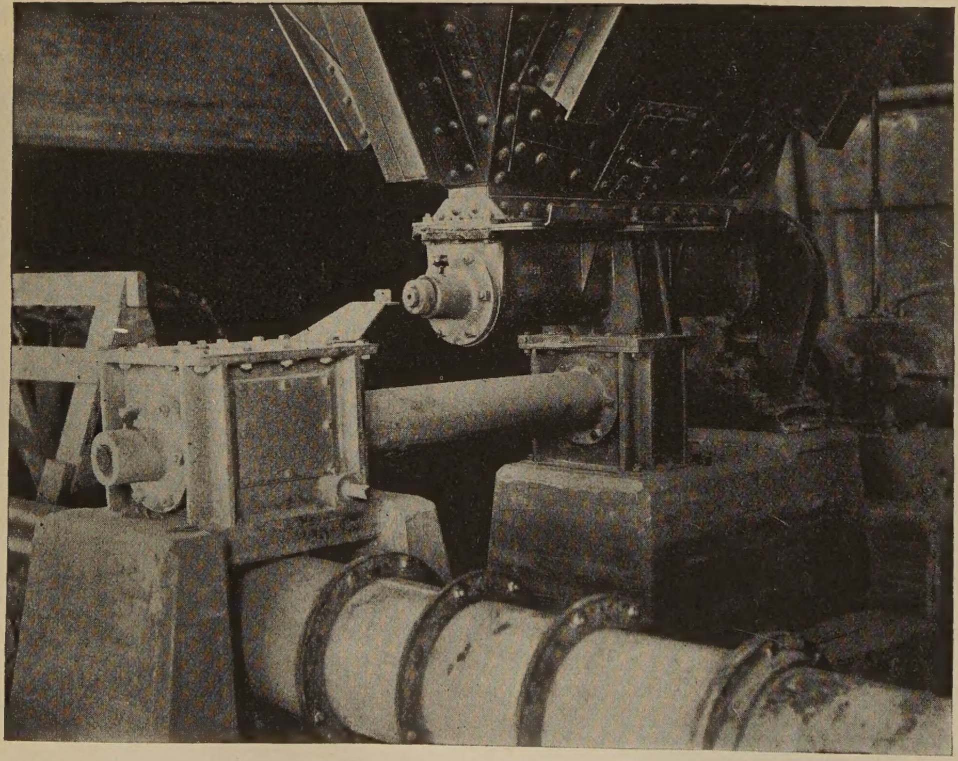

Fig. 3. Feeder for delivering pulverized coal, installed at the Michigan cement plant

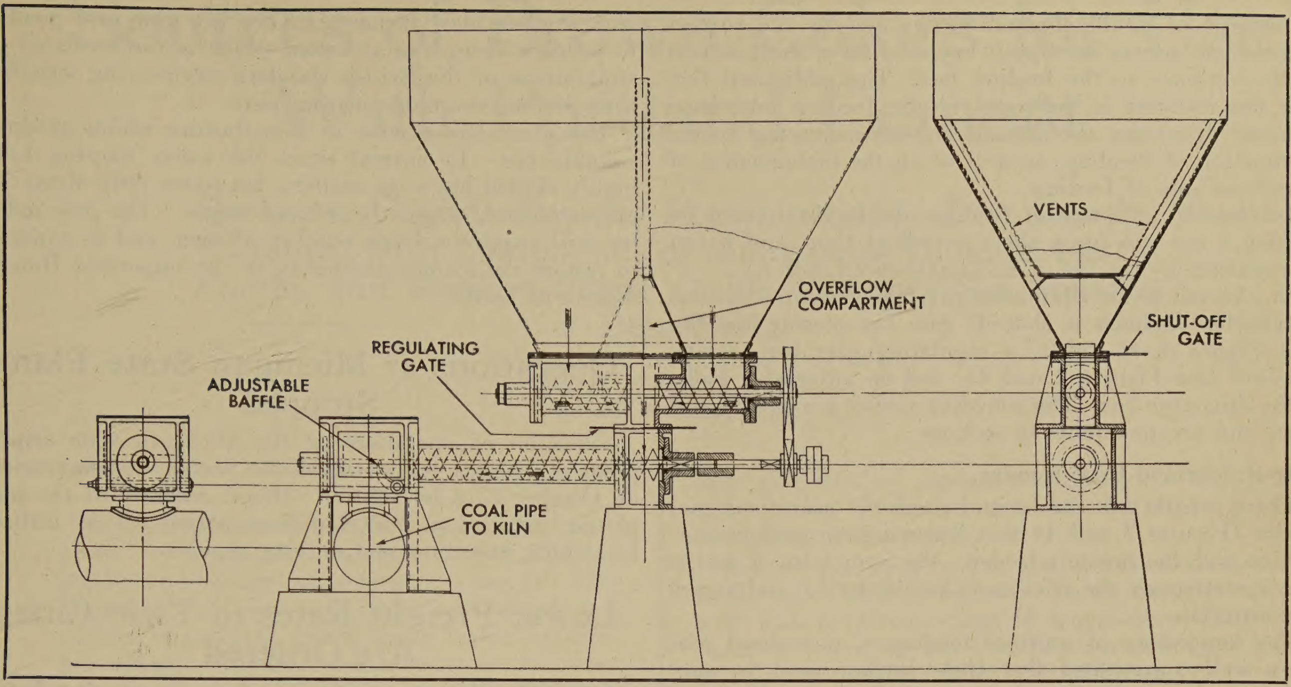

Fig. 4. Mechanical details of pulverized coal feeder illustrated in Fig. 3

to be pulverized coal, the result is a wide variation from the ideal burning conditions. If it is the raw mix, the excessive amount necessitates a reduction in the speed of the kiln or an immediate increase in the fuel supply, in order that the extra supply of material may be properly burned.

Several Successful Feeders of Dry Pulverized Materials

Several successful feeders of dry pulverized materials have been developed in recent years. One type, designed especially for the uniform feeding of pulverized coal, was described and illustrated in the issue of February, 1930.

Another type, designed for the feeding of both raw mix and pulverized coal, has been for some time in successful operation in a portland cement plant in Michigan. The following paragraphs contain a description of the installation, together with illustrations made from photographs taken in this plant.

These installations, known as the Huron feeders, may be studied further in the line drawings, Figures 2 and 4. The feeder for supplying the raw mix is of exceptional interest, for it deals with much the greater quantity of materials. Its construction and operation will therefore be described first, and in some detail.

The Raw Mix Feeder

The raw mix feeder consists essentially of a receiving box, a feeding box, three gear-driven conveyor screws, and a discharge box, the latter being shown at the left of Figures 1 and 2.

The overhead bin containing the pulverized raw material in storage is bolted to and supported by the receiving box, as shown at the right of Figure 1 and in the center of Figure 2. The receiving box has a rectangular opening of sufficient size to permit an ample flow of material, taking into account the angle of the side walls of the storage bin.

At this point it may be well to digress long enough to emphasize the importance of having a steep slope to the bin walls. The bins here illustrated have sides making an angle of a little more than 60 deg. with the horizontal. Experiments have shown that when this angle is around 60 to 70 deg. there is much less tendency for the material to arch or bridge over the outlet than when the slope is flatter.

Returning now to further consideration of the receiving box, it is divided into two sections, and beneath these sections there are two screw conveyors which work against each other. This detail can be seen to the best advantage near the center of Figures 2 and 4, where arrows show the direction in which the material is moved by the screws —that is, toward the center. This arrangement causes the material conveyed by the two screws to meet just above the feeding box, and just below the overflow compartment with which the feeding box is connected.

The purpose of this overflow compartment is that of providing a means of de-aerating the pulverized raw mix and bringing it to a condition of uniform density. At the bottom of the overflow compartment the raw material is continually being agitated by the supply brought in from both sides by the screw conveyors. This causes the material to be fluffed up into the overflow compartment, where the contained air is released and allowed to escape through vent pipes extending up the sides of the bin. These vents are indicated in Figures 2 and 4.

As the screw conveyors bring in the pulverized material from both sides it contains a certain amount of entrapped air. Being lighter than the de-aerated material in the bottom of the feeding box, it is pushed up into the overflow compartment, where it is de-aerated and gradually works its way downward because of its greater density. In this way a continual supply of de-aerated material is coming into the bottom of the feeding box, from which it is conveyed by means of a screw to the discharge box. This screw is keyed to the drive shaft, which is connected to the upper conveyor shaft by a spur gear and pinion. The discharge box is the rectangular box shown at the left in all the illustrations. From this box the material enters the pipe that conveys it to the kiln.

Flooding Eliminated

The installation at the Michigan cement plant has eliminated flooding, because of the steeply sloping bin walls and the large area of the receiving box. But even if such arching were to occur and a rush of material were to reach the screw conveyors, flooding would be prevented because of the use of double-flighted screws and by the further fact that the screws are tightly enclosed for a short section at the entrance to the feeding box. The additional fact that the material is delivered to the feeding box from opposite directions also has an important bearing on the elimination of flooding, as well as on the maintenance of a uniform rate of feeding.

Incidentally, the rate of feeding can be determined by making a test run for a short period of time, and it can be regulated by the use of a variable-speed motor.

In addition to the equipment previously mentioned, this installation includes a shut-off gate for closing the bin (see Figure 4, at right), a regulating gate for varying the feed (see Figures 2 ond 4), and an adjustable baffle in the discharge box. The conveyor screws are of standard types and are renewable in sections.

The Pulverized Coal Feeder

There is little that can be said about the pulverized coal feeder (Figures 3 and 4) that has not been said in connection with the raw mix feeder. The principles of design and operation are the same as in the feeder for pulverized raw material.

The importance of uniform feeding of pulverized coal is so well appreciated that little further need be said about it. It is only through evenness of feeding that control of combustion can be maintained.

The coal feeding installation, like the raw mix feeder, is designed to eliminate flooding and the consequent fluctuations in the flow. A comparison of Figures 3 and 4 with Figures 1 and 2 discloses the similarity in the mechanical details of the two feeders.

British Steel Mills Install Cement-Making Equipment

Steelworks in Leeds, England, have decided to install up-to-date equipment for the production of blast-furnace slag cement, in conjunction with the manufacture of pig-iron at their blast furnaces. They are now in a position to produce from slag a cement which conforms to all the stipulations of the British standard engineering specifications and to even more onerous tests.

The plant has a mine in Lincolnshire which produces suitable ore. In normal times the works employ 1,500 highly skilled big wage earners, but today only about 550 are employed, at greatly reduced wages. The new industry will require a large number of men, and is expected to restore the former prosperity of the important Hunslet district of Leeds.

Operations at Michigan State Plant Stopped

Cessation of operations at the Michigan state cement plant at Chelsea for an indefinite period was announced on October 23rd by John W. Miner, member of the state prison commission. The shut-down period will be utilized for taking inventory and making repairs.

Lower Freight Rates to Twin Cities Are Ordered

Lower freight rates on cement from Louisville, Nebr., to St. Paul and Minneapolis have been ordered by the Interstate Commerce Commission. The reduction amounts to 1 cent per hundred pounds, the rate having been cut from 17 to 16 cents.

The reduction goes into effect January 26th.

New Ohio Plant

Sixty-day options were secured during November on three farms totaling 150 acres near Greenfield, south central Ohio, and the possibility of the erection of a cement plant there has been announced locally.

The land is located along the D. T. & I. railroad, in the region of the Blue Rock, Inc., quarries.

Nebraska Newspaper Sizes Up the Cement Tariff

(An Editorial in the Nebraska State Journal, October 23rd, 1930)

SENATOR NORRIS in several speeches has sought to justify his vote against the 6 cent cement tariff contained in the Smoot-Hawley law by saying that it would prove to be a burden upon the people of Nebraska, and would increase the cost of the permanent paving upon the use of which this state has embarked at least $1,000 per mile. The facts do not justify either the reasoning of the senator or the conclusions that he draws as to the effect of the cement tariff.

The Smoot-Hawley law has been in force for a number of months, and it has not affected the price of cement in this section in the least. A number of paving contracts have been let in this state since that law has been enacted, and there has been no increase in cost of $1,000 a mile. On the contrary the cost is about the same as a year ago, with the possibility that it will go lower because this is a buyers' market, not a sellers' market, due to competition in production and falling off of demand.

An inspection of the freight tariffs shows clearly that there is no possibility of the cost being materially increased, and that if the price does go up the tariff can have nothing to do with it. The cement tariff was included to protect cement mills near the ocean and gulf ports against the foreign product which has been coming over as ballast freed of any freight charge. Cement such as is used in paving, because of its bulk and the high rate as compared with the value of the product itself, does not move to exceed 300 miles. Beyond that competition cannot be met.

The only quoted rail rate on eastern cement is from York, Pa., 44½ cents. As it costs only 9½ cents to move cement from the Louisville mills to Lincoln and only 11½ cents from Superior, it is easy to see that the rate from York, or from New Orleans, 45 cents, is in itself prohibitive, without counting in the tariff. No foreign cement has entered Nebraska because of the freight rate handicap in the years that it has been coming in free, and it follows that the tariff does not and cannot enter into the cost of cement used on Nebraska highways.

Sources of Brown Colors for Use With Portland Cement

Compound Oxide Browns Recommended—Best Results Obtained with Compounds of Manganese Dioxide, Ferric Oxide, and Ferroso-Ferric Oxide—Twenty-Six Sources Described

By E. T. ELLIS, F. J. I.
Ecclesall, Sheffield, England

In previous installments information has been given on unexploited sources of red, black, yellow, and blue coloring agents for cement. The present installment will take up unexploited sources of coloring agents where brown cements are wanted. However, readers who see this feature for the first time should read the introductory sections to the first four articles,[1] so as to clear their minds of the idea which is so common today that cement is colored during the actual process of manufacture. This, as stated previously, is always a subsidiary process. a pigment or a mixture of pigments being mechanically mixed with the finished cement, from which separation is somewhat difficult if not indeed impossible.—THE AUTHOR.

ANY first rate brand of portland cement can be colored brown, and may, therefore, be used as the starting point for the manufacture of brown cement.

Some Brown Cements

Cement men are aware that there is already quite an appreciable demand in Europe and elsewhere for brown cements of one shade or another. In the case of brown cements it is desirable to include a rich red brown, as this is becoming more and more popular. Then also, in the present chapter it is desirable to include pale browns which are greyish rather than blackish in hue. The various shades of brown merge into each other, and can be varied by altering the composition of the compound brown, without adding other pigments not already in the formula. This was not the case with most of the pigments already covered, as extra agents not already in the formula had to be added, as was pointed out, for instance, if orange-reds or orange-yellows were wanted. It is important again in the choice of compound brown oxides to select those which neither react with each other, nor which alter the character of the cement; but the chemical inertness which was such a striking feature of the coloring agent used in the preparation of black cements is not exhibited to anything like the same extent in the brown. It is not desirable, therefore, to make wide use of brown cements or brown cement mortars in the vicinity of chemical works. In the previous installments only three shades of colored cements were given, but in the present chapter it is desirable to increase this number and give five, as cement manufacturers will find that three brown shades are not sufficient to meet with all average requirements.

Brown is a warm color, and the red-browns are very attractive. Concrete made of brown cement harmonizes well with its surroundings in mountainous districts, and in towns where the use of dark colored stone is frequent. In this instance the employment of brown cement mortars is specially desirable; but in using red bricks or red building stone of the old red sandstone types, the rich red brown cement given in the final formula should be used in preference to all the others, as this goes best with them.

Compound Oxide Brown

A very large number of brown pigments have been introduced. Unfortunately, however, there is not one of these that is in the least suitable for use as a cement maker's coloring agent alone. For our purpose, therefore, it will be necessary to fall back upon what are known as compound oxide browns. One of the best of these is made up of manganese dioxide, ferric oxide, and ferroso-ferric oxide. Since unexploited sources of ferric oxide have already been fully discussed when speaking of red cements, it is not proposed to say anything about these here. Unexploited sources of ferroso-ferric oxide are relatively unimportant, and these also will not be dealt with. We are, therefore, left with those relating to manganese dioxide. Permanence is again a matter of the greatest possible importance, and all the simple brown pigments are very liable to change in contact either with the cement or under the influence of the atmosphere, especially if it is charged with chemicals. This compound oxide brown is undoubtedly as stable a pigment as we can at present obtain for our purpose, but at a later date it is hoped that something cheaper and less troublesome to mix may be produced. Like the others, it is insoluble or practically so in water, and not acted upon to any appreciable extent by ordinary moist air, unless chemical vapors are present.

Manganese salts which are in themselves utterly unsuitable for use as coloring agents for brown cement can often be manipulated fairly easily and quite cheaply so as to render them either ideal as starting points, or actually to transform them into manganese dioxide itself. The main object in manipulating them in this instance is either to get the manganese into a more or less soluble state from which impurities can be removed by mechanical filtration, prior to the precipitation of insoluble manganese dioxide from the filtrate, or conversely to prepare such a compound of manganese that will when roasted either in hydrogen, in air, or first in hydrogen and then in oxygen, produce manganese dioxide itself. Cement makers should, therefore, give considerable attention to these details before they reject any cheap manganese containing substance entirely outside their scope.

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[1] Cement Mill Section of CONCRETE, August, 1928, pages 95-96; May, 1930, pages 103-105; June, 1930, pages 103-105; and November, 1930, pages 81-86.

Unexploited Sources of the Coloring Agent

Twelve unexploited sources of carbon black were indicated in a previous installment, as will be recollected; but so far as brown cements are concerned, it seems desirable to cover no less than twenty-six unexploited sources of manganese dioxide in the present one. It is believed that the following are the most readily accessible of all, but there are hosts of others. The number of soluble, sparingly soluble, or insoluble substances containing manganese which are suitable directly or indirectly for the preparation of the dioxide which forms the mainstay of all formulas for brown cements, might quite easily be multiplied by four, if space were available for the discussion.

The following are the twenty-six unexploited sources I have in mind:

Black manganese mine tailings,
Bog manganese mixed residues,
Cupreous manganese mining residues,
Dialogite dump waste,
Earthy manganese offal,
Gray manganese gangue,
Manganese antimonate refuse,
Manganese arsenate mine waste,
Manganese arsenide refuse,
Manganese blende bank dross,
Manganese borate residues,
Manganese carbonate mining gangue,
Manganese chloride liquors,
Manganese hydrate or hydroxide trade precipitates,
Manganese phosphate pickings,
Manganese silicate mining bank waste,
Manganese spar sorters' refuse,
Manganese sulphate solutions,
Manganese sulphide mineral refuse,
Manganite mine dross,
Prismatic manganese ore pickings,
Psilomelane belt pickings,
Pyramidal manganese ore offal,
Red manganese refuse,
Rhodonite residues,
Wad waste.

Some of these substances possess little if any brown color to start with. Several are quite black, some are white, while some may be bright red to start with. While it is claimed that the liquid forms are the most easy to manipulate. in actual practice this does not always prove to be the case. I advise cement makers, therefore, not to be unduly keen on purchasing waste liquors from industrial washing plants, which may contain only very small quantities of soluble or sparingly soluble manganese in solution or suspension.

Manufacturing Methods

Each of the above sources of manganese dioxide for use in the preparation of brown cements requires some manipulation. The main details only are briefly summarized below, as has been done in all the previous articles. Cement concerns who require a more detailed discussion, especially in regard to those forms which contain very small quantities of manganese, should consult advanced treatises on inorganic chemistry.

Black Manganese Mine Tailings.—Essentially this consists of manganese manganate with a great amount of earthy gangue and other refuse. It should be severely concentrated by passage along an endless band arrangement, and the best sections only ground to powder. These should then be dissolved in hydrochloric acid, or (more accurately) suspended in this solution, as much of the gangue will not dissolve. Insoluble impurities should be filtered off, and sodium hydroxide liquor added to the filtrate. If air is then pumped through it much manganese dioxide can readily be filtered off, and this should be dried. If the lower oxide is present it should be calcined in oxygen prior to being reground for mixing with ferric oxide and the ferroso-ferric form.

Bog Manganese Mixed Residues.—These may be exploited as a source of manganese dioxide in the manner described in detail under the heading of Wad Waste, toward the end of this article.

Cupreous Manganese Mining Residues.—These residues consist of complex mixtures of manganese dioxide, copper oxide, cobalt oxide, and earthy gangue. They should all be very severely concentrated by repeated passage along endless bands, and the best samples only ground to powder. Next dissolve this dust in hydrochloric acid or suspend it in vats containing that liquor, and filter off what does not go into solution. The copper must be precipitated from the filtrate by pumping hydrogen sulphide into it, after which mechanical filtration should be again resorted to. Cobalt can be thrown down by the addition of freshly precipitated manganese sulphide, and refiltration can then be resorted to. Following this, throw the manganese down by the addition of bleaching powder liquor, and filter this off at once, washing it well, and drying it before grinding it.

Dialogite Dump Waste.—This essentially consists of very impure manganese carbonate. It may be exploited as a source of manganese dioxide in the same manner as that described when speaking of manganese carbonate mining gangue farther on.

Earthy Manganese Offal.—This may be exploited as a source of manganese dioxide for the coloring of cement brown in the manner described in detail under the heading of Wad Waste.

Gray Manganese Gangue.—This residue, while it sometimes contains much manganese, as a rule consists very largely of earthy gangue. Severe concentration on an endless band is absolutely essential, and in most instances three or four passages are necessary in order to get rid of refuse satisfactorily.

Following this treatment, dry the concentrated portion, grind it up, and dissolve it in concentrated commercial sulphuric acid. The liquor should be diluted with water prior to being filtered, and ammonium persulphate added, after which the combination of the two liquors should be boiled. By this means it is possible to filter off most of the manganese dioxide, and this should be well washed, dried, and ground to a powder.

Manganese Antimonate Refuse.—Small parcels of this can sometimes be picked up in industrial centers, and should be concentrated if necessary. In most instances, however, the powdered mass may at once be dissolved in hydrochloric acid, and the liquor diluted, so that the antimony may come down more or less completely in the form of the oxychloride. The liquor should then be evaporated, and diluted with a large volume of water again, in order to obtain further hydrolysis. It may then be evaporated a second time, after which the manganese dioxide is precipitated from it in the same manner as that described when speaking of manganese chloride liquors below.

Manganese Arsenate Mine Waste.—This refuse can frequently be picked up in quite appreciable quantities, and cement men should buy all they can. It requires very careful concentration on an endless band arrangement, as a big quantity of unwanted gangue is always present. The best samples are roasted in lump form, without grinding, after charcoal has been mixed with the lumps in order to reduce the arsenic content as far as possible. The roasted mass should subsequently be put through a pulverizing mill, and digested either with hydrochloric or with sulphuric acid, whichever is the cheapest or most convenient. Filter off insoluble matters, and decompose the filtrate containing manganous chloride by means of calcium hypochlorite liquor, or sodium hypochlorite liquor, while ammonium persulphate liquor is best employed if the filtrate contains manganous sulphate. In either instance the manganese dioxide should be filtered off, well washed, and carefully dried. Some forms of it contain combined water, and this must be driven off by extra heat during the drying operations. Following this the dioxide is ground and is ready for use.

Manganese Arsenide Refuse.—Very thorough concentration of this residue on an endless band arrangement is absolutely necessary, in order to remove as far as possible arsenides of other metals, which might otherwise have to be separated by precipitation or other means before the manganese dioxide is obtained. Assuming that these are absent, however, the best samples of the arsenide obtained from the refuse are roasted in an oxidizing atmosphere, and after being powdered are dissolved in hydrochloric acid if manganous chloride is wanted, or better still in sulphuric acid. Impurities should be allowed to settle down, and the liquor decanted therefrom. From the filtrate or siphoned-off liquor it is easy to precipitate the manganese in the form of carbonate, by the addition of sodium carbonate, provided that the solution is hot. This should be filtered off, well washed, and first heated in hydrogen to produce the lower oxide, and then heated in oxygen to produce the manganese dioxide. Lastly it should be ground to the form of an impalpable powder.

Manganese Blende Bank Dross.—This refuse consists essentially of manganous sulphide and earthy gangue. Most of the latter must be removed in the first instance by severe concentration on an endless band, and the best possible samples only of the blende dross carefully ground up. A suspension of this powder is then made in hydrochloric acid, so that the sulphide may be decomposed, and impurities may settle down, or if still in suspension may be rendered capable of being removed by mechanical filtration. Following this the filtrate containing manganous chloride should be evaporated, again filtered, and treated in the same manner as that described when speaking of manganese chloride liquors farther on.

Manganese Borate Residues.—These are mostly in coarse powders, and contain impurities which have been accidentally introduced, and render them unsuitable for their originally intended purpose, which is usually for the production of paint driers. The powders should be concentrated on a band to remove coarse particles, and in this instance a band sieve is desirable. Following this the borate should be well washed, ground if still coarse prior to being dissolved in hydrochloric acid in excess. If this liquor is now evaporated some of the boric acid can be removed by mechanical filtration. Powdered manganous oxide should then be added, and the liquor warmed, the object being to increase the content of manganous chloride and to decrease the content of free hydrochloric acid. Following this, further evaporation and mechanical filtration is desirable, and concentration yet again in multiple evaporating pans until nearly saturated, followed by yet another filtration to get rid of boric acid. The liquor is then diluted, and calcium hypochlorite liquor added. The precipitated manganese dioxide is then well washed, dried, and ground.

Manganese Carbonate Mining Gangue.—This source of manganese dioxide frequently contains small quantities of soluble impurities which can be washed out, as the carbonate itself does not appreciably dissolve in water. Earthy gangue must be got rid of by very careful concentration on an endless band arrangement, following which the best pieces of the carbonate should be carefully ground, and heated in hydrogen in order to produce manganous oxide. Following this, heat the lower oxide in oxygen in order to produce a dioxide. After grinding the latter it is ready for use.

Manganese Chloride Liquors.—Chlorine manufacturers sometimes have waste liquors containing manganese chloride in solution, with impurities in suspension, and cement concerns should buy these up if they are satisfied that the amount of manganese present is enough to justify treatment. Some firms are impudent enough to offer liquors containing only one per cent of the chloride, their concentrated liquors having been diluted with ordinary water to increase their bulk. These, of course, are utterly worthless for our purpose.

Owing to the complete solubility of manganese chloride in water, many impurities may be got rid of by mechanical filtration immediately after they arrive, a further filtration after they have stood for a day, and additional filtration after being partially evaporated being desirable.

The manganese dioxide can be most easily precipitated from these liquors by adding bleaching powder liquor thereto, though sodium hypochlorite or indeed other oxidized compounds of chlorine and bromine can be used if reasonably cheap. After adding the liquor to the manganese liquors, the combination of the two should be very thoroughly agitated, and the precipitate allowed to settle. This last should be very thoroughly washed, dried, and ground to powder.

Manganese Hydrate or Hydroxide Trade Precipitates.—Several trades produce as by-products manganese in a hydrated state of oxidation, or as the actual hydroxide, while several are glad to get rid of trade precipitates, which consist of mixtures of the various hydrated oxides of manganese. Nearly all these oxidize very readily in contact with the air, and advantage of this fact should be taken in exploiting them as a source of manganese dioxide for use in the preparation of brown cements.

The first step consists of washing well the hydrated refuse in order to remove soluble impurities as completely as possible. It should then be introduced into shallow trays without drying, and air should be blown over it, this air having been passed through caustic soda or up a tower of quicklime to take carbon dioxide out of it. The oxidized mass should then be decomposed by heating in order to remove combined water, and if the content of a lower oxide of manganese is still substantial it is necessary to heat it in oxygen to transform these into the dioxide. Following this, the latter should again be washed, dried, and then finely ground.

Manganese Phosphate Pickings.—Phosphates of manganese are mined in only comparatively few districts, but cement men should buy the belt pickings whenever they can. These contain substantial quantities of manganese phosphate, and require thorough concentration on endless bands in order to remove granitic impurities which are very hard and difficult to grind.

Next pass the concentrated phosphate through grinding mills, and suspend it in hydrochloric acid, in order to decompose the compound as completely as possible. Filtration prior to subsequent dilution is desirable, and calcium chloride should be added, taking care to avoid any excess. Then filter off the calcium phosphate which is precipitated, and throw down the manganese in the usual way by the addition of calcium hypochlorite liquor. This dioxide should then be well washed, dried and ground.

Manganese Silicate Mining Bank Waste.—Many methods have been proposed for the exploitation of this as a source of manganese dioxide, but most of them are not at all satisfactory. The best plan consists of concentrating the silicate bank waste on an endless band, as a great amount of dirt is always present, following which it should be ground, and then fused with potassium carbonate. Lixiviation in water is next necessary, insoluble matters being filtered off. If much potassium manganate is present, air should be pumped through the liquor, and the first consignment of manganese dioxide filtered off and washed. Then add hydrochloric acid and filter off siliceous impurities which are then deposited, following which the rest of the manganese can be precipitated by the addition of ammonium persulphate liquor, this being well washed and subsequently ground.

Manganese Spar Sorters' Refuse.—Frequently this contains quite enough manganese to be well worth exploiting. Unusually thorough concentration on an endless band arrangement is absolutely necessary in order to get rid of the major portion of the earthy impurities, following which the manganese dioxide may be obtained in the same manner as that described when speaking of manganese carbonate mining gangue above.

Manganese Sulphate Solutions.—Manufacturers of oxygen can sometimes sell cheap solutions containing manganese sulphate. Here again, however, unscrupulous traders frequently dilute their liquors in order to increase their bulk, unless we are careful to state the concentration that we require. Owing to the complete solubility of manganese in the manganous form as sulphate in water, many impurities which are held in suspension can be removed by mechanical filtration, taking this, however, in several stages. For instance, filter immediately on arrival, and filter again two or three times during its concentration in multiple pans. When a nearly saturated solution has been obtained, manganous sulphate can be precipitated therefrom by the addition of absolute alcohol, in which it is insoluble, and many impurities which dissolve in the spirit are got rid of very easily by this means. The sulphate should then be dissolved in distilled water, and may be precipitated either by calcium hypochlorite or ammonium persulphate in liquid form. The manganese dioxide readily deposits under these conditions, and can be filtered off, well washed, and dried for immediate use.

Manganese Sulphide Mineral Refuse.—Cement concerns who are able to get this unexploited source in mining districts should take advantage of the fact that it is not water soluble, and remove soluble impurities by washing. Following this it should be concentrated thoroughly on an endless band arrangement, ground to a coarse powder, and treated with hydrochloric acid, impurities being again filtered off. The manganese dioxide is precipitated by the addition of calcium hypochlorite liquor, and is separated from the solution by mechanical filtration, after which it is very thoroughly washed, dried, and ground.

Manganite Mine Dross.—This consists essentially of hydrated manganese sesquioxide, but there is always a great amount of unwanted dirt present as well. Concentrate it thoroughly on an endless band arrangement, grind it to a coarse powder, and suspend this in hydrochloric acid, filtering off impurities which fail to go into solution. To the filtrate ammonium hydroxide should be added, taking care to avoid any excess. The precipitated manganese should be very thoroughly washed, dried, and heated in oxygen, as much of the lower oxide is always present.

Prismatic Manganese Ore Pickings.—These consist, as cement men will expect, of crude manganese dioxide, mixed with a big amount of unwanted gangue. Much of the latter can be removed by severe concentration on an endless band arrangement, after which the best lumps of crude dioxide should be very well washed. This operation will enable them to be passed again along the endless band for a second sorting, and the dust having been taken off the pieces by the washing, further stone or gangue can be thrown out. Cement men should next break the pieces to the form of nuts and sort again, this final concentration being done on a comparatively narrow band, so that no small bits of unwanted matter can escape attention. Lastly the small portion which remains should be ground up for use.

Psilomelane Belt Pickings.—This refuse consists of a mixture of manganese and barium oxide, along with a vast amount of unwanted dirt. It is necessary, therefore, to concentrate it very thoroughly on an endless band, following which it should be ground up till a coarse powder is produced. To the powder hydrochloric acid should be added, and after filtering off sparingly soluble impurities, a solution of manganous sulphate should be run in, the object of this being to precipitate the barium as sulphate without adding any other metal.

Next filter off the precipitate, and add hydrated ammonium sulphide to the filtrate. By this means the manganese will be precipitated without a lot of other metals, and this sulphide should be washed after decantation and redissolved in hydrochloric acid, after which the dioxide can be precipitated in a relatively pure state by means of bleaching powder liquor, as described when speaking of manganese chloride liquors.

Pyramidal Manganese Ore Offal.—Chemically this consists of mangano-manganic oxide, but there is usually such a lot of dirt in it that this compound oxide is hardly recognized. Every effort should first be made, therefore, to get rid of gangue by careful and repeated concentration on an endless band arrangement, following which the lumps of oxide should be ground up.

Then dissolve the ground lumps in dilute acid, selecting either sulphuric or hydrochloric, and carrying this out by slow digestion. Some manganese dioxide will remain; that is, it will not go into solution. This should be filtered off and well washed, it being ready for use after being dried. The filtrate should be boiled, filtered again if necessary, and sodium hydroxide solution added. This precipitates the manganese in the form of the hydrated oxide, and that can be filtered off and washed. Lastly it should be dried and calcined, and finally heated in oxygen in order to oxidize lower oxides.

Red Manganese Refuse.—This consists of manganous carbonate, with a large amount of earthy refuse containing small quantities of manganese oxide. Cement men can exploit it as a source of manganese dioxide for use in the preparation of brown cements if they concentrate it very thoroughly on an endless band, and then treat it in the manner already described under manganese carbonate mining gangue.

Rhodonite Residues.—These consist essentially of very low grade manganese silicate. The amount of unwanted dirt present is, as a rule, very large. Concentration on an endless band should, therefore, be the first step and this should be unusually thorough. Following this, finely grind the residue, and digest it with hydrochloric acid for a prolonged period. The liquor should then be warmed and filtered, and the manganese dioxide can then as a rule be obtained without much difficulty if it is further exploited in the manner already described when speaking of manganese chloride liquors.

Wad Waste.—This consists of the crudest possible form of manganese dioxide with a big amount of black dirt, sometimes containing other oxides of the same metal.

Throw it on to an endless band, and sort it with the greatest possible care, following which it should be washed extremely thoroughly, and if necessary passed again along the band, so that further stone or hard foreign gangue can be got rid of. The next step consists of heating it in air in order to oxidize lower oxides as completely as possible, the air having been filtered to remove dust, and having been pumped up a tower of quicklime to remove carbon dioxide.

Next grind the oxidized wad, and heat the powder in an atmosphere of oxygen if lower oxides of manganese are still present, as they nearly always are. Lastly it should be ground again, and is then ready for use.

Proper Proportions

Regarding the proportions of manganese dioxide, ferric oxide, and ferroso-ferric oxide which can safely be mixed with cement, this is subject to unusually wide variation. Brown cements which contain relatively small quantities of these pigments are naturally more economical than those containing large quantities, and it must always be remembered that if a deeper colored cement is used considerably more cement has to be employed in order to secure a satisfactory set. This is rather more pronounced in the case of brown cements than in the case of the yellow ones, as the actual quantity of the pigment is rather larger. Cement men and concrete users must invariably keep in view, especially with the darkest of all, the fact that a large quantity of an adulterating substance or a mixture of such substances entirely without setting properties is present. Otherwise the strength of the work will be considerably less than when an uncolored cement is employed, and the quality will suffer. Owing to the relative cheapness of manganese dioxide prepared from the above sources, and again the comparative cheapness of ferric oxide prepared from the unexploited sources described in my first article, cement firms will not find that they have to sell cements containing this mixture at a very close market figure. Most customers can readily be persuaded that a brown cement, being so much more attractive than an ordinary grey one, is well worth the enhanced price which has to be asked for it.

Suitable proportions for five shades of brown cement are given below:

PALE BROWN CEMENT

	Parts
Cement	940
Manganese dioxide	30
Ferric oxide	20
Ferroso-ferric oxide	10

Mix the four very thoroughly in a dry state. Otherwise a streaky effect is certain to result.

MEDIUM BROWN CEMENT

This is one of the best formulas for general use, and has been extensively employed in Europe.

	Parts
Cement	880
Manganese dioxide	60
Ferric oxide	40
Ferroso-ferric oxide	20

Mix all four ingredients together with extreme thoroughness, and take particular care that the pigment mixture is in a perfectly dry state.

DARK BROWN CEMENT

The tint of this is remarkably rich and pure, comparatively free from redness; but as in the case of the other deep shades described in the four previous installments it is an extravagant mixture to use, as approximately 18 per cent more than uncolored cement has to be used if the concrete or cement mortar is to set satisfactorily.

	Parts
Cement	820
Manganese dioxide	90
Ferric oxide	60
Ferroso-ferric oxide	30

In this instance the three pigments should be mixed together, and gently warmed before mixing with the cement, in order to insure complete absence of moisture. The mixture of cement and three pigments is then ground together over a prolonged period, in order to insure the most intimate incorporation, as with such a lot of color present streaky work is unavoidable unless this is done.

EXTRA DEEP BROWN CEMENT

This is obtained by reducing the quantity of red pigment, as follows:

	Parts
Cement	880
Manganese dioxide	80
Ferric oxide	20
Ferroso-ferric oxide	20

Admixture of the four ingredients should be extremely thorough, great care being taken that each is perfectly dry.

RICH RED BROWN CEMENT

This is obtained by increasing the amount of red pigment, as follows:

	Parts
Cement	880
Manganese dioxide	40
Ferric oxide	60
Ferroso-ferric oxide	20

The three coloring agents can first of all be mixed together in this instance with great advantage, and then added to the cement, warming them if there is the slightest trace of moisture present. Admixture must be extremely thorough if streaky work is to be avoided.

Lehigh Stock Feels Effect of Dividend Cut

Following reduction of the dividend on common stock to $1 annually, shares of the Lehigh Portland Cement Company declined on the New York stock exchange to a low of 15 against a high of 42 this year.

The company's last annual report for the year ended November 30, 1929, showed current assets of $18,873,223 and current liabilities of $1,910,106, leaving net working capital of $16,963,117, equivalent to $37.66 for each of the 450,348 shares of common stock outstanding. The current assets included $3,929,544 in cash, $8,000,000 in demand loans and $1,258,500 in Liberty loans. In addition, the company had more than $3,000,000 in loans to subsidiaries and other investments.

Mexican Plant Doubles Capacity

The Monterrey Portland Cement Company is doubling the capacity of its plant at Monterrey, Mexico. The additions, when completed, will permit a production of 2,000 barrels daily.

New Marketing Plan Announced by Cement Companies

Dealer Differential Replaced by Service Payment at End of Year—More Than 50 Plants Represented by Companies Taking Action—15-Day Cash Discount Remains

NEW marketing plans which discontinue the old dealer discount of 10 cents per barrel and replace it, in effect, by a service payment of 5 cents per barrel at the end of the calendar year, have been announced by a number of cement companies.

One version of the new plan was first announced on November 10th, by one of the large cement companies, and since that date a number of others have followed suit with similar plans.

Among the companies which have taken action are the Lehigh, the Alpha, the Universal Atlas, the Medusa, the Penn-Dixie, the Edison, the Allentown and the Lawrence. These companies represent 53 plants with an annual capacity in excess of 100,000,000 barrels. In addition to these companies, a majority of the smaller plants in the East, and a number of those in the Middle West, have announced similar marketing methods.

Various companies have adopted variations in details, but in general they are in agreement on the essentials.

The new marketing plan is the result of much thought and discussion over a long period among manufacturers, dealers and users. It constitutes an effort to overcome the defects of the old dealer discount system which had been the cause of much dissatisfaction among dealers, users and manufacturers alike.

This new method will enable dealers to sell at prices justified by the service they render—and, at the end of the year, to receive the service payment of 5 cents per barrel on all direct purchases from the cement company. In addition to the 5 cents service payment, the dealer will continue to receive the present 15-day cash discount of 10 cents per barrel.

The new method provides the manufacturer with a way to sell in carload lots direct to the user in localities where there is no dealer or where the dealer is not in a position to perform the normal functions of buying, selling and collecting.

Where the Old Method Failed

For many years it was the practice of cement companies to quote large contractors and other large users of cement 10 cents per barrel higher than the quotations to dealers.

About five years ago this plan was modified to the extent of quoting the same price at a given destination to all buyers of cement; but the dealer differential was maintained by allowing a special dealer discount of 10 cents per barrel.

After a time some of the dealers began passing part of their discount on to the cement user. More recently the dealer competition for the big orders had become so keen that many of the dealers retained only 2 or 3 cents of the discount, passing the remaining 7 or 8 cents per barrel to the contractor customer. In fact in some cases the dealer passed on the entire discount, retaining no profit for themselves.

The result of this practice among dealers was that the contractor frequently was able to buy cement from the dealer at a price below that quoted him by the manufacturer of the same brand of cement. This naturally led to the suspicion that some one was making a big profit in cement, when as a matter of truth the dealer was giving away so much of his discount that he had little or no profit left.

Essential Points of New Method

While, as stated, the details of the new plan vary with different cement companies, the essential features are much the same with all of them. Under the new method all transactions between the manufacturer and the dealer will be on an outright purchase and sale basis. That is, the dealer performs all the functions of purchaser and seller, carrying the accounts and assuming full credit responsibility on his sales.

As a separate and distinct transaction, the cement company will pay the dealer, at the end of each calendar year, a special service payment of 5 cents per barrel on the quantity of cement invoiced to and paid for by the dealer during the calendar year. The service payment will not be made at the time of payment of invoices. It will not be applied against unpaid accounts due from the dealer.

Contracts between manufacturers and dealers covering cement for use in specific work will provide for the 5 cents service payment.

In some cases the dealer may be unable or unwilling to carry out a complete transaction with a user. In such a case the cement company will deal directly with the user, the price being the same as to a dealer; but in this event neither the dealer nor the user will receive the 5 cents service payment.

Dealers Approve and Disapprove

Both approvals and disapprovals of the new marketing method have been received from dealers. Some of the dealers who have criticized the new plan have apparently misinterpreted the cement companies' announcements. Consequently, it is probable that, when the new arrangement is thoroughly understood, the objecting dealers will be fewer in number than at present.

High-Early-Strength Cement Is Made Like This

In explaining the use of high-early-strength cement in repairing pavements in busy streets, an Ohio newspaper informs its readers that "The quick-drying cement used at street intersections is made by double drying it in the kiln."

Farther on in the same newspaper story is the further surprising information that "The concrete will carry 4,800 pounds to the square inch, or capable of carrying a load over the street of 145,152,000,000 pounds."

These are two more items for the Believe-It-or-Not department.

~ EDITORIAL ~

Competition and Co-operation Must Go Hand in Hand

NEVER was the need for united action in the cement industry greater than at present. This view was emphasized in a forceful manner by Dr. Ralph E. Heilman, dean of the school of commerce of Northwestern University, at the annual dinner of the Portland Cement Association on November 18th.

"The most important recent transformation in the spirit and ideals of business," Dr. Heilman said, "is the increasing emphasis which is being placed upon concerted, joint and united action by associated business organizations, as distinguished from purely individual action by isolated enterprises. Business men are coming to realize that, although they have certain interests in conflict (as, their desire for sales), they also have certain common and mutual interests; and that within the limits of these mutual interests, concerted action may prove much more advantageous than purely individual action.

"This newer spirit expresses itself through trade associations which exist for the purpose of promoting those interests which are larger and broader than the interest of any single member, but which are common to the industry as a whole.

"This movement does not mean the disappearance of competition, but it does mean that competition and co-operation must be recognized as taking their place, side by side and hand in hand, as the two dominating forces in modern industry."

Taking the Marketing Bull by the Horns

THE new marketing plans announced by eight cement companies, having a total of 53 plants and an annual capacity in excess of 100,000,000 barrels, should go a long way toward clearing up a chaotic condition of many years' standing—a condition that has been unsatisfactory to dealers, to large cement users and to cement manufacturers alike.

The new arrangement makes a definite distinction between the large user who requires cement in carload lots and is in a position to handle shipments, and the smaller retail buyer who ordinarily gets his cement from the local building material yard.

The main trouble with the old dealer differential system is that too many dealers give most of the differential away. In the keen desire for the big orders they retain only 2 or 3 cents of the 10-cent differential allowed them by the cement companies, the remaining 7 or 8 cents going to the dealer's customer. This practice often leads to the confusing situation in which a contractor receives a lower quotation from a dealer than from the manufacturer of the same brand of cement.

Under the new system the old 10-cent dealer differential is replaced by a service payment to the dealer at the end of the calendar year, amounting to 5 cents per barrel on all his direct purchases from the cement company. This arrangement leaves dealers free to sell to their regular retail customers at prices which include a reasonable charge for the services rendered. The present 15-day cash discount remains in effect.

The manufacturer is provided with a way to sell in carload lots direct to the user for construction projects, large products plants and ready-mixed concrete plants so located that the dealer is obviously not in a position to handle the order.

No marketing system can be satisfactory in every respect. Some objectionable features will always develop. The best that can be done under prevailing conditions is to select a system in which the favorable features predominate. The marketing plan just announced seems to meet this requirement, for it takes into consideration the interests of the dealer and the large user as well as the interests of the manufacturer. The dealer receives no profit on cement which he never sees and which he is not in a position to handle. On the other hand, responsible dealers are protected against certain outstanding evils that have grown up on their side of the fence.

The new marketing plan should not be long in finding favor with the better element among the dealers themselves.

Still More Cement Mills

REPORTS are current of efforts being made to promote a new cement mill in Ohio.

With the long existing and constantly increasing spread between capacity and production in the cement industry, and the probability that the spread will widen further, it would seem improbable that investors could be interested in a new cement mill venture.

The trouble is that appeals for the support of such ventures are not made altogether on an investment basis. Local pride in the prospect of establishing an important new industry in the town constitutes a far more powerful appeal.

An attempt on the part of an association or group of cement manufacturers to block such a move could easily be misinterpreted and might be subjected to severe criticism. Individuals in the cement industry, however, will do a favor to investors, and serve their own interests at the same time, if they will place the facts before the newspaper-reading public. The facts are given in a chart printed in this issue.

The Passing of a Pioneer

By **ROBERT W. LESLEY**

One of the Founders of the American Portland Cement Industry, Philadelphia, Pa.

Richard K. Meade and Robert W. Lesley both were pioneers in the American portland cement industry. Both were closely identified with the industry throughout its fabulous growth, and their paths must have crossed in many places. It is therefore fitting that Mr. Lesley, who was one of the founders and the first president of what is now the Portland Cement Association, has accepted our invitation to tell our readers something about the life work of Mr. Meade.—The Editors.

IN the death of Richard K. Meade, chemical engineer, on October 13th, 1930, the American portland cement industry has sustained a great loss.

Mr. Meade, who was born in 1874, at Charlottesville, Virginia, received his education at the University of Virginia; and between the years 1897 and 1901 was instructor in chemistry at Lafayette College, Easton, Pa.

In his work in this capacity he was brought in contact at an early age with the great development of the portland cement industry in the Lehigh Valley. As is well known, it was in this territory that the American portland cement business found its earliest and most successful growth. Saylor's works at Coplay, pioneers in the field, were just above Allentown, about fifteen or twenty miles from Easton. The American Improved Cements Co. was at Egypt, not far away from the Coplay plant; and the Atlas plant was not far off, on the same side of the Lehigh River.

The success of these companies induced others to enter the field to deal with the wonderful raw cement-making material found in the vicinity of Easton and Allentown, in the Lehigh Valley. The Vulcanite Portland Cement Co. and the Alpha Portland Cement Co. were located near Easton, and later on—in 1897—the great Lehigh Cement Co. established its first works near the American and Coplay plants.

It will be seen from this that the young instructor in chemistry at Lafayette College naturally found himself in a congenial atmosphere, where he became familiar with the early development of the cement industry and had many opportunities to test the materials used, and in a general way to give advice to the early works. It was a very natural growth for him to find himself—in 1901—chief chemist at the Edison Portland Cement Works, which had been established by Thomas A. Edison, the great inventor; and in this plant he obtained his first practical knowledge of what cement making was and the difficulties of the industry.

In the year 1900 the total output of portland cement was a little more than 8,000,000 barrels a year, having a value of about $9,000,000, and struggling valorously to increase its efforts to drive foreign portland cements out of the American market. In the year 1901, when Mr. Meade entered upon his new duties, there was an increase of 50 per cent in the portland cement output, which in that year almost reached a total of 13,000,000 barrels, of which the sixteen mills in Lehigh and Northampton Counties, Pennsylvania, and in Warren County, New Jersey, all of which were in the territory around Allentown and Easton, produced 8,595,340 barrels.

From these figures it can readily be seen what a field there was for a clear-cut, well-educated, soundly-grounded chemist such as Mr. Meade had shown himself to be.

From the Edison works he went as chief chemist of the Dexter Portland Cement Company, where he remained until 1907, in which year he established the Meade Testing Laboratory at Allentown, Pa., a much-needed institution in the industry, covering the same general field as that covered by the Lathbury & Spackman and the Booth, Garrett & Blair laboratories in Philadelphia, both of which had done much chemical testing and engineering work in the early days of portland cement manufacture. Mr. Meade carried on this work for a number of years, and at the time of his death was head of the firm bearing his name, with headquarters at Baltimore, recognized as one of the important consulting engineering firms in the portland cement industry.

While thus employed, he became by reason of his experience and study generally known among cement mill owners as an extremely good consulting engineer or "family doctor" to cure the various ills to which cement manufacturing is incident. He was consultant for many of the leading concerns and had a high reputation in this field. In one case of the Tidewater plant near Baltimore, in 1911, he

The late Richard K. Meade, "family doctor" to the portland cement industry acted not only as consulting engineer, but also as general manager for a year in the company's early existence.

Another field in which Mr. Meade was quite distinguished was as engineer for the construction of a large works for the manufacture of potash from the green-sand marls found in southern New Jersey, where it was proposed to extract the potash and make sand-lime brick with the by-products.

While acting as chemical engineer in all these various ways, Mr. Meade was not idle in the field of literature. In 1900 he published the Chemists' Pocket Manual. In 1904 he issued the first edition of his well-known book on portland cement, of which new and up-to-date editions were issued in 1906, 1911 and 1926. Another of his works was entitled "The Design and Equipment of Small Chemical Laboratories," a book of much use to chemists.

His book, "Portland Cement," is considered an authority on many subjects in the cement field and represents great study and industry. It is quoted frequently in scientific circles.

As a member of the American Institute of Chemical Engineers, the American Chemical Society and the American Society of Mechanical Engineers, Mr. Meade took part in many discussions relating to cement. He also participated in many other scientific meetings devoted to this subject.

He had many friends in his chosen field and in the cement industry was much liked. When called in consultation, he took the sincerest and deepest interest in the subject and generally managed to throw new light on any mooted question.

He certainly added much to the knowledge of cement in the early days of the industry, when engaged not only as scientific engineering consultant, but also as a practical manufacturer in the works where he was chief chemist. He saw the growth of the business from the very interesting days of its childhood to the present days of its fabulous growth and always did his share of man's work, contributing as he did, in engineering and chemical knowledge, in new inventions and processes, and in the field of valuable literature concerning his chosen career.

Safety Group Concerned Over Fatal and Severe Accidents

By EDWARD H. PARRY
Glens Falls Portland Cement Company, Glens Falls, N. Y.

IN the portland cement industry we have tried to get away from the cut and dried discussion of mechanical hazards and to stress the problem of dealing with the human element. This seemed proper to us when we knew that only a small 10 per cent of our accidents are due to mechanical dangers, and the remainder due to the ethereal, intangible human element. It is our feeling that delegates sent to this Congress from the cement industry are sent here because they are outstanding safety men, who do not need technical instruction nearly as much as they need encouragement, a pat on the back, a stimulus to their jaded spirits so that they may go back to their jobs with a determination to eliminate accidents. With this idea in mind our program has been formulated.

As we view the problem of accident prevention we feel its primary purpose is the abolition of fatal accidents and those accidents which leave a human being helpless and unable to earn his living. A few years ago our cement industry awoke with a start from a certain feeling of complaisance to discover that while our frequency was dropping rapidly, our fatalities and severity rates were mounting at an alarming rate. Recent figures indicate that the present calendar year will show a splendid reduction in fatal accidents and a corresponding reduction in severity rating. Work along this particular phase of our problem must continue with a greater expenditure of effort. At the present time we, as an industry, hold the enviable position as leader among the industries of the country with a frequency rate of 9.55 per million man-hours worked. It is disgraceful, but a fact, that our industry is at the same time fourth highest in severity rating. There is but one conclusion to draw. The path of our work is clearly indicated. We must bend every effort toward the reduction of our severity rate not in order to be undisputed leaders in the industrial world, but to reduce the unnecessary toll on humanity.

As we look forward to the future, what is the outlook? Are we, a year from today, to be rated as fourth highest in severity or are we to approximate more closely our frequency standing among the industries of our country? The answer lies here in this group of men and the men we represent. We have the knowledge of, or the source of knowledge, how it can be done. It remains only for us to return from this Congress to our jobs filled with enthusiasm for the task, optimistic of the final results and never throughout the year to lose this enthusiasm and optimism.

Abstracted from the author's annual report as general chairman of the cement section of the National Safety Council, presented at the Nineteenth Annual Safety Congress, Pittsburgh, Pa., Sept. 29 to Oct. 3, 1930.

International Profit for October Better Than a Year Ago

The International Cement Corporation net profit for October after federal taxes is estimated at $356,000, against $277,000 for October, 1929. Net for the first ten months is estimated at $3,803,000, against $3,805,000 in the similar period of last year.

Earnings for October, 1930, are equal to 55c a share and for ten months to $5.98 a share on the 635,763 shares now outstanding. This compares with 44c a share for October, 1929, and $6.06 a share for the ten months of 1929 on 627,624 shares then outstanding.

Health Ministry Grants Permission for Canterbury Plant Erection

The British minister of health has decided in favor of Frank Cooper, Ltd., in the matter of the opposition to this company's proposed cement plant at Canterbury. The hearing before the health ministry was mentioned on page 88 of November issue of CONCRETE.

The minister has decided to grant permission for constructing the plant, subject to appropriate conditions. Before giving formal effect to his decision he proposes to arrange for officers of the department to confer with representatives of the company and the city council of Canterbury with a view to settling the conditions to be imposed.

The new works will be one of the most important cement producers in the south of England.

Toledo Picked by Universal Atlas for New Packing Plant

The construction of a new storage terminal and sacking plant at an investment of at least $1,000,000 on the waterfront of Toledo, Ohio, is planned by the Universal Atlas Cement Company.

The site is now occupied by railroad coal docks and is served by a direct connection with the Toledo Terminal railroad. Dismantling of the docks and construction of the cement terminal is expected to begin next spring, it is reported.

Aetna Buys Farm Land for Raw Material

The Aetna Portland Cement Company has recently purchased 113 acres of farm land containing clay near its plant at Essexville, Michigan. The consideration was placed at approximately $10,000.

90,000,000 Barrels Plus

Building of New Cement Plants Has Been Proceeding at About One-Third Above Requirements—Chart Presents Situation Graphically—Trade Position of the Industry

CAPACITY over the production of the nation's cement plants has grown to about 90,000,000 barrels in the last seven years, according to Erwin Boehmler, in the *Chicago Journal of Commerce and La Salle Street Journal* of November 10th. The building of new plants has proceeded at a rate of about three barrels for every two barrels of new demand.

Most of this over-capacitation has developed since 1923, since which time approximately 113,000,000 barrels of new capacity have been added, as contrasted with 91,000,000 barrels in the sixteen preceding years. In 1907, approximately 11 per cent of the total manufacturing capacity of the industry was idle and two years later jumped to 31 per cent. In only four years since 1909, has the proportion of idleness dropped below 20 per cent, and in the 1918 year reached as high as 48 per cent. During 1929, slightly more than 34 per cent of the cement producing capacity remained idle, and on the basis of production figures to date, a small further increase will be recorded during the current year.

It is noteworthy that in every year subsequent to 1909, the succeeding year failed to absorb the additional production capacity erected in any one year. In fact, the additions made to capacity in 1911 were not fully absorbed for over a decade (See B on Chart 1, reprinted by permission of the *Journal*). Because of several years of rapid gain, from 1922 to 1925, the extent of excessive capacity was cut down. In the three succeeding years the rate of gain in production slowed down, but the erection of additional capacity continued at a more rapid pace.

This existence of the large volume of idle production capacity necessarily weakens the trade position of the manufacturers. In every year since 1921, there has been a reduction in the average price per barrel of cement.

Both the productive capacity of the industry and the consumption of cement have advanced fairly steadily and within two decades, output has increased from less than 48,000,000 barrels in 1907, to a record of 176,298,846 barrels in 1928. The production receded to about 171,000,000 barrels in 1929, and estimates indicate a slight shrinkage to 169,000,000 barrels for the full 1930 year on the basis of the 1.01 per cent reduction in output in the first nine months of the current year.

The over-capacitation volume is almost as large as the total cement production in the United States in any year prior to 1920, and practically equivalent to the combined annual production of the three leading cement-making nations of Europe.

The commodity is in a comparatively strong statistical position, as contrasted with other building materials.

Although demand and production in the current year approach an equilibrium and consumption of cement has kept up to the levels of a year ago, it is not likely that earnings of the manufacturers will be maintained at the levels of last year, due to the somewhat lower price prevailing. The reflection of less satisfactory performance has already been found in such revenue reports as have been published covering recent operating periods. During the first seven months of 1929 cement sold at about $1.65 a barrel, which contrasts with prices of about $1.60 a barrel during 1930 to date.

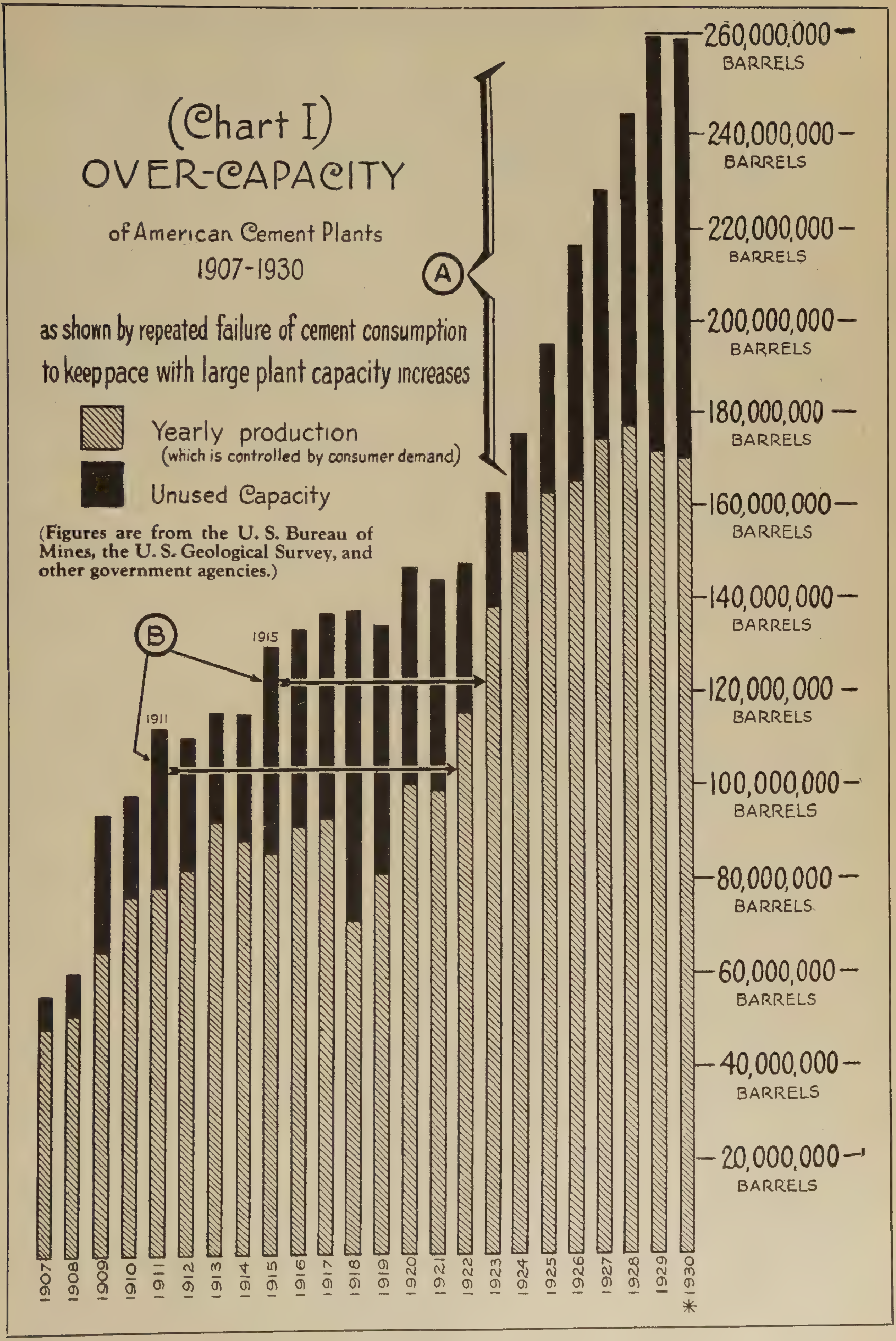
Chart Legend

(A) Five successive years of huge capacity gains (1925-29), unaccompanied by any proportionate gain in production and consumption, have contributed to the present large over-capacity of the American cement industry.

(B) The huge excess capacity piled up since 1925 has been accumulated despite the warnings of the year 1911, whose new capacity was not matched by production for eleven years, and the second warnings of 1915, whose contribution to the surplus was not absorbed until 1923.

Over-capacity, and its attendant reduced operations and unemployment, result whenever production (which is rigidly held in check by consumer demand) cannot keep pace with new plant construction and mill enlargements.

*Estimated total for entire year 1930 is figured at same rate as set by first nine months of the year. A heavy decline indicated for the final three months, however, may cause a much sharper drop in production.


(Chart I)
OVER-CAPACITY
of American Cement Plants
1907-1930
as shown by repeated failure of cement consumption to keep pace with large plant capacity increases
▨ Yearly production (which is controlled by consumer demand)
■ Unused Capacity
(Figures are from the U. S. Bureau of Mines, the U. S. Geological Survey, and other government agencies.)
A
B
1911
1915
260,000,000 BARRELS
240,000,000 BARRELS
220,000,000 BARRELS
200,000,000 BARRELS
180,000,000 BARRELS
160,000,000 BARRELS
140,000,000 BARRELS
120,000,000 BARRELS
100,000,000 BARRELS
80,000,000 BARRELS
60,000,000 BARRELS
40,000,000 BARRELS
20,000,000 BARRELS
1907
1908
1909
1910
1911
1912
1913
1914
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1918
1919
1920
1921
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1923
1924
1925
1926
1927
1928
1929
1930
*

Business Aggressiveness Urged On Association Members

President Frank H. Smith Points Way to Cement Industry's Future—Would Concentrate Efforts on Building Industry and Public Improvement Programs—Annual Meeting Well Attended

CONTINUED aggressiveness with an eye toward speeding up general business recovery was urged upon American portland cement manufacturers by President Frank H. Smith, at the annual meeting of the Portland Cement Association, held in Chicago on November 17th, 18th and 19th. No other industry, the association executive pointed out, is better situated to aid in alleviating the depressed business condition which has been general for the last few months.

"We market our cement," President Smith said, "by creating markets for concrete. In so doing we provide work to those who furnish sand, gravel, stone, reinforcing materials, forms, contractor's equipment and other items. So the resultant of our development activities is to maintain or increase the purchasing power of very many more people than we actually employ.

"In a broad sense, whatever measure of prosperity we enjoy is the public's. We know that every pound of cement well used in roads, bridges, buildings or houses earns the owner an eventual return far greater than the manufacturer's profit."

While the portland cement industry up to the end of October has felt a decline of nearly eight million barrels in 1930 shipments, President Smith pointed out that so far the 1930 showing is well above that of business in general. The decline is a little more than 5 per cent of the 1929 figures. He attributed this showing to benefits reaped from patiently cultivated markets. "The demand now on cement manufacturers by both the cement industry and business in general is greater aggressiveness in all fields of business endeavor," he said.

Mr. Smith urged especially great concentration of efforts on the building industry and public improvement programs. The unfounded fear, in northern states, of winter construction can and should be broken down. Construction started this winter, besides helping to alleviate the present unemployment situation, will create employment for thousands of people next spring and summer. There is no reason for delaying improvement programs, he declared. Where public funds are available projects should start immediately. Such work initiated through bond issues and other means of public finance, can create employment now and be paid for in the future.

Mr. Smith dealt at some length with the greatly improved highway conditions brought about in the country during the last dozen years.

"The very active construction of main line roads during the last dozen years has led, naturally, to a strong sentiment for the improvement of secondary roads as feeders to primary systems. The 'farm to market' highways have acquired a very substantial following throughout the rural districts and a careful study of the requirements, and of the 2,000 miles already in use, shows that the single-tracked concrete road is admirably adapted for this purpose."

Unwarranted speculation in new mill enterprises was warned against by the Portland Cement Association president. An industry, he pointed out, that is already overbuilt should do its utmost to discourage public investment in new enterprises that are, at the beginning, marked for failure. In this connection he stated that at the present time there is an idle capacity within the industry of approximately 100 million barrels, almost equal to the total reported capacity of Germany and France.

Mr. Smith pointed to the reduction within the industry during the last five years of accidents involving either injury or death. The standard of living of cement workers, he declared, has been raised to higher levels than ever before attained.

Mr. Smith, who is president of the Lawrence Portland Cement Co., and who has held the office of president of the Portland Cement Association for two consecutive years, was elected chairman of the board of directors of the association. Wm. M. Kinney, for twelve years general manager of the association, was elected vice-president and general manager.

Monolith Midwest Closes Down for Winter

The temporary seasonal shut-down of the Monolith Portland Midwest Company plant south of Laramie, Wyoming, began November 1st, about three weeks later than that of other plants in the vicinity.

Reopening is scheduled for February.

Northwestern States Secures Iowa Charter

The Northwestern States Portland Cement Company, at Mason City, Iowa, was issued a charter of incorporation on November 1st by the State of Iowa. It was formerly a West Virginia corporation. The capital stock consists of 225,000 shares of no par value.

Valley Junction Plant Cuts Production

The Valley Junction, Iowa, plant of the Pennsylvania-Dixie Cement Company on October 16th started operations on a revised schedule cutting the production 50 per cent, to continue for the balance of the year. Practically all employes are now working on an eight-hour shift basis.

Ideal Contracts for Natural Gas

The Ideal Cement Company has signed a 15-year contract with the Interstate Gas Company for the delivery of natural gas for fuel to the Portland, Colorado, cement plant.

The gas will be piped laterally from Devine, 45 miles east of Portland.

Cement Statistics for October

Production and Shipments Fail to Gain, While Stocks Increase 34 Per Cent—Relation of Production to Capacity Shows Greater Gap

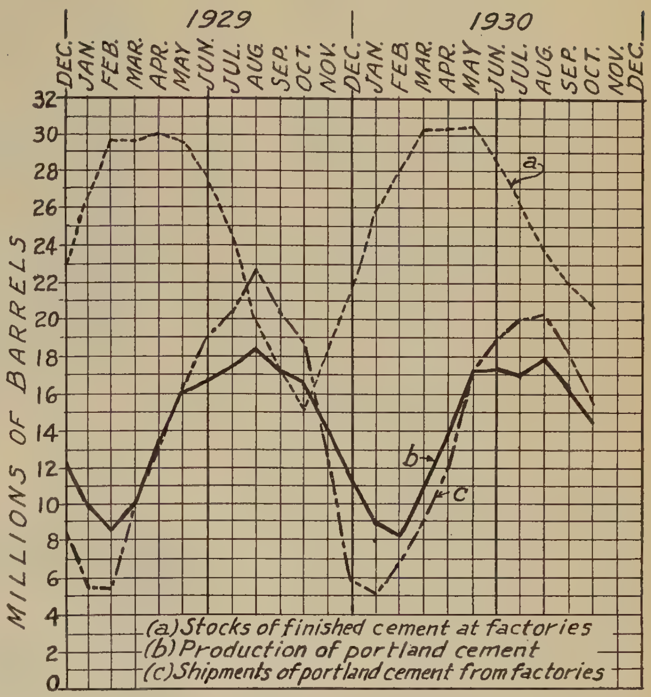
	1929	1930	Increase or Decrease (—) Per Cent
Production, October	**16,731,000**	14,410,000	—13.9
Shipments, October	**18,695,000**	15,599,000	—16.6
Stocks at end of Oct.	15,381,000	**20,699,000**	34.6
Total production for year to date	**144,930,000**	141,327,000	—2.6
Total shipments for year to date	**152,264,000**	144,272,000	—5.5
No. of plants reporting	165	165	....

NOTE: IN ORDER THAT THE READER MAY KNOW THE TREND AT A GLANCE, THE HIGHER FIGURE, WHETHER FOR EITHER YEAR, UNDER ANY CLASSIFICATION, APPEARS IN SLIGHTLY HEAVIER TYPE.

Relation of Production to Capacity

(Figures represent per cent)

	—October—		Sept.	Aug.	July
	1929	1930	1930	1930	1930
The month	**77.0**	65.4	75.7	81.0	77.8
The 12 months ended	**67.3**	64.2	65.2	65.6	66.1



Production, Shipments, and Stocks of Finished Portland Cement, by Districts, in October, 1929, and 1930, and Stocks in September, 1930

District	Production—October		Shipments—October		Stocks at end of month —October—		Stocks at end of September, 1930*
	1929	1930	1929	1930	1929	1930	
Eastern Pa., N. J. and Md.	**3,571,000**	2,793,000	**4,043,000**	3,535,000	4,000,000	**4,225,000**	4,966,000
New York and Maine	1,129,000	**1,220,000**	**1,407,000**	1,201,000	996,000	**1,088,000**	1,069,000
Ohio, Western Pa., and W. Va.	**1,731,000**	1,655,000	**2,176,000**	1,704,000	2,240,000	**3,030,000**	3,079,000
Michigan	**1,437,000**	1,130,000	**1,323,000**	1,093,000	1,075,000	**2,317,000**	2,279,000
Wis., Ill., Ind. and Ky.	1,935,000	**1,938,000**	**2,346,000**	2,115,000	1,329,000	**2,574,000**	2,751,000
Va., Tenn., Ala., Ga., Fla. and La.	**1,306,000**	1,132,000	**1,419,000**	1,248,000	1,498,000	**1,697,000**	1,814,000
Eastern Mo., Ia., Minn. and S. Dak.	**1,718,000**	1,591,000	**1,870,000**	1,618,000	1,273,000	**1,542,000**	1,569,000
W. Mo., Neb., Kan., Okla. and Ark.	**1,331,000**	957,000	**1,508,000**	947,000	621,000	**1,652,000**	1,643,000
Texas	**777,000**	484,000	**743,000**	469,000	527,000	**721,000**	707,000
Colo., Mont., Utah, Wyo. and Idaho	**323,000**	134,000	**346,000**	227,000	**451,000**	415,000	508,000
California	**1,179,000**	953,000	**1,183,000**	1,006,000	937,000	**966,000**	1,020,000
Oregon and Washington	294,000	**423,000**	331,000	**436,000**	434,000	**472,000**	484,000
	16,731,000	14,410,000	18,695,000	15,599,000	15,381,000	20,699,000	21,889,000

Production, Shipments, and Stocks of Finished Portland Cement, by Months, in 1929 and 1930

Month	—Production—		Shipments—October		Stocks at end of month	
	1929	1930	1929	1930	1929	1930
January	**9,881,000**	8,498,000	**5,707,000**	4,955,000	26,797,000	**27,081,000**
February	**8,522,000**	8,162,000	5,448,000	**7,012,000**	**29,870,000**	28,249,000
March	9,969,000	**11,225,000**	**10,113,000**	8,826,000	29,724,000	**30,648,000**
April	**13,750,000**	13,521,000	13,325,000	**13,340,000**	30,151,000	**30,867,000**
May	16,151,000	**17,249,000**	16,706,000	**17,224,000**	29,624,000	**30,891,000**
June	16,803,000	**17,239,000**	**18,949,000**	18,781,000	27,505,000	**29,364,000**
July	**17,315,000**	17,078,000	**20,319,000**	20,153,000	24,525,000	**26,289,000**
August	**18,585,000**	17,821,000	**23,052,000**	20,299,000	20,056,000	**23,824,000**
September	**17,223,000**	16,124,000	**19,950,000**	18,083,000	17,325,000	***21,889,000**
October	**16,731,000**	14,410,000	**18,695,000**	15,599,000	15,381,000	**20,699,000**
November	14,053,000	....	11,222,000	....	18,213,000	....
December	11,215,000	....	5,951,000	....	23,538,000	....
	170,198,000	....	169,437,000	....	....	....

*Revised.

MEN and MILLS

Notes from the Field

Owens Is New Association Safety Engineer

Beginning December 1st, Stanley Owens will be a member of the Portland Cement Association staff as safety engineer.

Mr. Owens was formerly safety engineer at the Bureau of Safety, an organization which handles the safety insurance work of a middle west utilities group. For several years he was engaged in the general work of the bureau and held membership in a number of important committees relating to national and intercompany safety affairs. He is a graduate of Armour Institute of Technology.

While the safety work of the association will remain under the general direction of A. J. R. Curtis, assistant to general manager, it is expected that Mr. Owens will handle a large share of the field work.

C. A. Irvin, Alpha Vice-President, Dies Suddenly

Charles A. Irvin, vice-president of the Alpha Portland Cement Company, passed away unexpectedly on October 29th at his home in Chicago. As Mr. Irvin had been active and apparently in good health, his sudden death came as a shock to his friends and business associates.

Mr. Irvin was a native of Illinois, having been born in Bloomington, in 1872. He became associated with W. F. Cowhan and an elder brother, J. S. Irvin, when the latter organized the International Portland Cement Company, Ltd., with headquarters at Ottawa, Canada. Mr. Irvin retained connections with that company during the period when it built and put into operation plants at Hull, Quebec, and other points in Canada. Subsequently these properties were purchased by the Canada Cement Company, Ltd.

In 1912 the Irvins built the cement plant at Irvin, Washington, a suburb of Spokane, and the operating company, although entirely independent of the Canadian company, became known as the International Portland Cement Company, Ltd. In 1914, Mr. Irvin became vice-president and general manager of that company, making his home in Spokane. He remained there until 1919, when he came to Chicago to assume the presidency of the LaSalle Cement Company, which was formed at that time to purchase and operate the German-American Portland Cement Works of LaSalle, Illinois, then in the hands of the alien enemy custodian.

Later, when the LaSalle Cement Company was merged with the Alpha Portland Cement Company, Mr. Irvin became a vice-president of the latter and remained in Chicago in charge of the western interests.

Mr. Irvin was active in the affairs of the Portland Cement Association, having served several terms as vice-president and member of the board of directors. He served also on many important committees and attended meetings of the association regularly.

Charles Irvin, who died at Chicago on October 29th

Funeral services were held from the family residence in Chicago on October 31st. Many friends accompanied the special train on the Illinois Central Railroad which bore the remains to Bloomington for burial on November 1st.

Mr. Irvin is survived by his wife, and one son, Ward Irvin, of Battle Creek, Michigan.

New Penn-Dixie Directors

Percy H. Johnston, president of the Chemical Bank and Trust Company, and Victor N. Roadstrum, attorney, have recently been elected additional directors of the Pennsylvania-Dixie Cement Corp.

Illinois Manufacturers Hosts to Foreign Road Delegates

Highway engineers, numbering about 100 from 24 different countries, and 20 American, on a tour of the middle western and north central states, were the guests of LaSalle and Oglesby, Illinois, cement manufacturers on October 23rd and 24th. They had recently attended the International Road Congress held at Washington, D. C.

Arriving at LaSalle at 9 o'clock in the evening, three hours behind schedule, and following dinner, the delegates began an inspection of the three local cement plants at 11 o'clock at night. For many it was the first opportunity to visit such plants and much interest was evinced.

On behalf of the foreign engineers, T. J. Lvov, of Russia, chief engineer of bridges in the Russian department of public works, expressed their appreciation for the hearty welcome given them in LaSalle.

Mr. Lvov declared that during the next two years the Russian government contemplates constructing 200 miles of concrete highways and he pointed out that he is placing high value upon his visit to America because of the engineering data he is compiling here.

Pyke Johnson, executive secretary of the U. S. Highway Educational Board, expressed his appreciation to LaSalle for the manner in which the delegation was handled and thanked the LaSalle Chamber of Commerce and the Illinois Valley Manufacturers' Club for the co-operation they had given.

The large delegation is making the inspection trip aboard five mammoth buses and another bus, used for the transportation of baggage, accompanies them. An escort of five motorcycle patrolmen is accompanying them through Illinois and their visit in that state is being supervised by Frank T. Sheets, chief of the state division of highways, and his assistant, R. H. Benedict. Several federal department of commerce officials also are on the tour to assist with arrangements.

Callihan, Wifco Superintendent, to Visit in Washington

Robert Callihan, Jr., superintendent of the Wifco department of the Superior, Ohio, cement plant, will visit with his parents and friends in Washington, D. C., over the Christmas holidays.

Three Cement Men Lose Lives in Ohio Mine Disaster

Robert D. Parsons, general superintendent of the Columbia Cement division of the Pittsburgh Plate Glass Co. and who lost his life in the mine disaster at Millfield, Ohio, on November 5th, was born in Ohio in 1885.

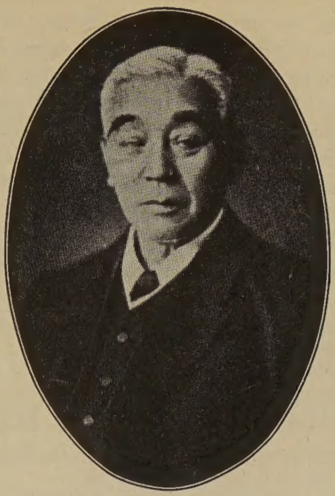
His first position after graduating from Carnegie Institute was with a rubber company, with which he continued as technical manager of the Paris branch until 1924. He then joined the Pittsburgh Plate Glass Company and was appointed superintendent of the Columbia cement division, with a plant at Fultonham, Ohio.

Thomas B. Trainor, traffic manager, and Vernon Roberts, mill foreman, were also killed in the accident, which occurred at the Sunday Creek Coal Company mine during an inspection tour of officials.

Aged Head of Asano Company Passes Away

Soichiro Asano, president of the Asano Portland Cement Company, died at Tokyo, Japan, on November 9th. He was 82 years of age.

Mr. Asano started his company, now the third largest producer of cement in the world, in 1882. He had also extensive shipping interests, including a line of passenger and freight boats sailing from Japan to every port in the Pacific and around the world.



Soichiro Asano

Newhard to Allentown Over Holidays

George Newhard, night repairman at the Superior, Ohio, cement plant, subsidiary of the Wellston Iron Furnace Company, has been granted a leave of absence over the Christmas holidays and plans to visit his mother and other relatives in Allentown, Pa.

Dettelbach and Duncan Are Elected Heads of Manufacturers' Club

Frank C. Dettelbach, president of the Utica Hydraulic Cement Company, La Salle, Illinois, was elected president of the Illinois Valley Manufacturers' Club for the forthcoming year at a meeting on November 3rd.

Stuart Duncan, director of the Marquette Cement Manufacturing Company, was elected vice-president and treasurer.

Baumberger with San Antonio Portland 50 Years

Charles Baumberger, president of the San Antonio Portland Cement Company on October 28th completed fifty years of service with the firm. He first become connected with the latter as a part-time bookkeeper, and has held his present position since 1896. He was born and reared at San Antonio, Texas.

Mill Equipment

Ingenious Design in New Variable Speed Transmission

What is said to be the first all-metal variable-speed transmission on the market has recently been announced by the Link-Belt Company, Philadelphia. It is called the P.I.V. gear, the initials standing for "Positive Infinitely Variable," indicating its characteristics.

Basically, this new speed change unit consists of two pairs of wheels of the opposed conical disc type, between which a unique chain transmits power. The effective diameters of each pair of wheels can be altered under load to change the speed ratio, without steps and without dependence upon friction, it is stated. On changing speed, the self-pitching chain rises in one set of wheels and descends in the other, so that while the input shaft connected to a motor or other source of power turns at constant speed, the output shaft is brought to the desired r.p.m.

The original feature of the P.I.V. gear is its use of a positive chain drive to transmit the power. Radial teeth are cut in the conical faces of the driving discs, and the self-adjusting teeth projecting beyond the sides of the chain are arranged to positively engage the radial teeth of the discs.

The chain used in the P.I.V. gear is made up of a series of steel leaves or links with joints consisting of hardened steel pins turning in segmental bushings. There are no teeth on the inner surface of this chain. Instead, what may be called teeth are made up of packs of hardened steel laminations or slats which extend through slots in the links at right angles to them, and project about ⅛ inch at each side of the chain. The individual containers which hold the packs of slats are secured in the openings of the links, but, within each such container, the slats are free to slide from side to side individually with relation to each other and adjust themselves to engagement with the radial teeth of the discs, over substantially the full range of diameters. The angle of the slat ends, 30 deg., is the same as that of the conical faces of the wheels.

The P.I.V. gear has been put into production by the Link-Belt Company for the present in five sizes, from 1 to 10 h.p. capacity, providing speed change ratios up to a maximum of six to one. It has been thoroughly tested throughout the past year by continuous use in various operations and is said to have proved dependable and efficient.

A book, No. 1274, illustrating and describing the Link-Belt P.I.V. gear, will be sent upon request to Link-Belt Company, Philadelphia, Indianapolis or Chicago.

New Line of Swing Hammer Equipment by Stedman's

For over fifty years a manufacturer of crushing, grinding and pulverizing machinery, Stedman's Foundry and Machine Works, Aurora, Indiana, has entered the swing hammer mill field with a complete line of swing and ring hammer crushers, grinders, and pulverizers.

The line consists of three types and twenty-five sizes of mills—the smallest machine requiring 5 h.p., the largest, 250 h.p. The type "A" mill, a general purpose machine, is manufactured in nine sizes. It is especially designed for fine and semi-fine grinding and pulverizing.

All materials are reduced by the 2-stage reduction method, an exclusive Stedman feature, it is stated. The finish grinding or sizing is accomplished after gravity has been overcome. This secondary reduction step takes place between the face of an adjustable grinding plate and the hammer tips.

Besides the 2-stage reduction method of grinding, Stedman mills are said to have these special features: Built-in metal trap, exceptionally heavy renewable wearing plates, adjustable grinding plate, self-aligning anti-friction bearings, extreme sectional construction (which allows for instant accessibility), and a heavy, rigid construction in the machine proper.

The type "B" machines are used for preliminary or secondary crushing. This mill is made in sixteen sizes—ranging from 15 h.p. to 250 h.p. The larger sizes will handle 18 to 24-in. cubes of limestone, gypsum, rock, shale, etc., reducing to ¾-in. and under in one reduction. Type "B" machines are also used extensively for reducing R. O. M. coal. This type can be furnished with either swing hammers or ring hammers.

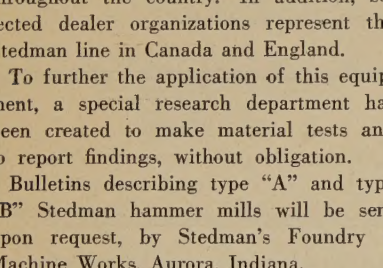
A. E. Schneider, well known in the hammer mill field, is in charge of designing and sales. District sales offices are maintained in Atlanta, Los Angeles, Philadelphia, San Francisco. Special Stedman agents are located in all principal cities throughout the country. In addition, selected dealer organizations represent the Stedman line in Canada and England.

To further the application of this equipment, a special research department has been created to make material tests and to report findings, without obligation.

Bulletins describing type "A" and type "B" Stedman hammer mills will be sent upon request, by Stedman's Foundry & Machine Works, Aurora, Indiana.

Cutler-Hammer Makes New Magnetic Separator Pulley

Simple construction, better wearing qualities and lower price are features of the new type "W" magnetic separator pulley which is announced by Cutler-Hammer, Inc., Milwaukee, Wis. The new pulley has only three major parts—a machined cast steel spool, the magnet coils and a coil shield—with the necessary insulation. The magnet coils are wound on the steel spool and vacuum impregnated to make them moistureproof. The coil shield is then welded to the spool so that it completely encloses the coils. This coil shield is of Allegheny metal.



The commutating mechanism, which conducts the current to the magnet coils, is mounted on one end of the pulley shaft. Heavy brass collector rings and carbon brushes assure good contact at all times. A dust-proof cover protects the commutating mechanism from dust and other flying particles and protects operators from accidental contact with live parts.

These new magnetic separator pulleys are made in 12-in. diameter size and in six lengths, for belt widths varying from 12 to 30 inches.

New Enclosed Motors Have External Fan for Cooling

The General Electric Company announces a new line of dust-tight, totally enclosed fan-cooled induction motors. These motors are totally enclosed, are equipped with ball bearings, are inclosed in convenient "cartridge" housings, and utilize a single ventilating fan located outside the enclosure proper.

A point stressed by the manufacturer is the fact that the new line provides a totally-enclosed motor of the same mounting dimensions, rating for rating, as the standard General Electric open type, horizontal, general purpose motor, from ¾ to 50 horsepower in popular speeds.

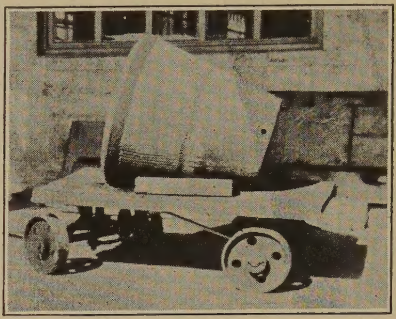
The motor is endorsed by the Underwriters' Laboratories for hazardous dust conditions specified as Class 2 in the National Electric Code and may be obtained with the Underwriters' label indicating its suitability for such conditions.

Hascrome Designed to Prolong Life of Gyratory Crusher Mantles

Recent tests by a mining company in northern California have shown the application of Hascrome welding rod to worn crusher mantles to be highly successful. According to the Haynes Stellite Company, the average life of a manganese steel mantle crushing copper pyrites was found to be approximately 6 months. At the end of this time the 2½-in. thick metal is practically worn through. One of these castings was reclaimed by building up the worn surface with Hascrome, after being taken out of service. Ninety pounds of this material was used, requiring 25 hr. of labor to apply it. The total cost of rebuilding, including overhead, amounted to slightly more than 25 per cent of the cost of a new mantle. At the end of four months, this part, having crushed 28,000 tons of copper pyrites, showed but 5/32 in. of wear. It was again recoated and put back into service.

Another mantle, reclaimed with Hascrome, was examined at the end of three months. It had worn about ⅛ in. while crushing 21,000 tons of the same ore. This was also built up to the desired size and put on the job once more. Since then, this company has sent three more mantles to their shop for reclamation.

In the Salt Lake City district of Utah, a smelting and refining company built up a "two-piece" crusher mantle, using 125 lb. of Hascrome. It was put in service in December, 1929, and is still in perfect condition. The saving over the cost of a new one in this case was practically 60 per cent; and subsequent to the results obtained from the first casting, this company had adopted reclaiming with Hascrome as standard practice for all its gyratories. Had this mantle been of one-piece construction and of larger size, the percentage of saving due to reclamation instead of replacement would have been even higher.



The welding procedure for resurfacing these castings was in accordance with the standard practice for applying Hascrome by the electric arc method. Reverse polarity was used: namely, the ¼-in. Hascrome rod was made the positive electrode. A current of from 200 to 250 amp. was found to be most desirable. It is not always necessary to use a flux coating on the rod, for excellent results have been obtained without it. However, if a flux coating seems desirable, it can readily be made up by mixing some brazing flux with carbide sludge and water. Both methods of laying down the electric beads longitudinally and circumferentially have been tried, and from the results obtained, either procedure is satisfactory. However, general practice seems to favor the longitudinal bead: that is, parallel to the axis of the mantle.

Best results are obtained if the coating is applied at irregular intervals around the mantle. If the rod is used alternately at perhaps the quarter points, there is less danger of warping the piece because by this method the welder will not get the casting too hot by concentrating the heat at one point. In this manner the danger of undue strains and cracks is materially reduced. It is more economical to rebuild the worn surfaces after the mantle has been slightly reduced in size than to wait until the metal has been ground almost entirely away.

The illustration shows a typical gyratory crusher mantle.

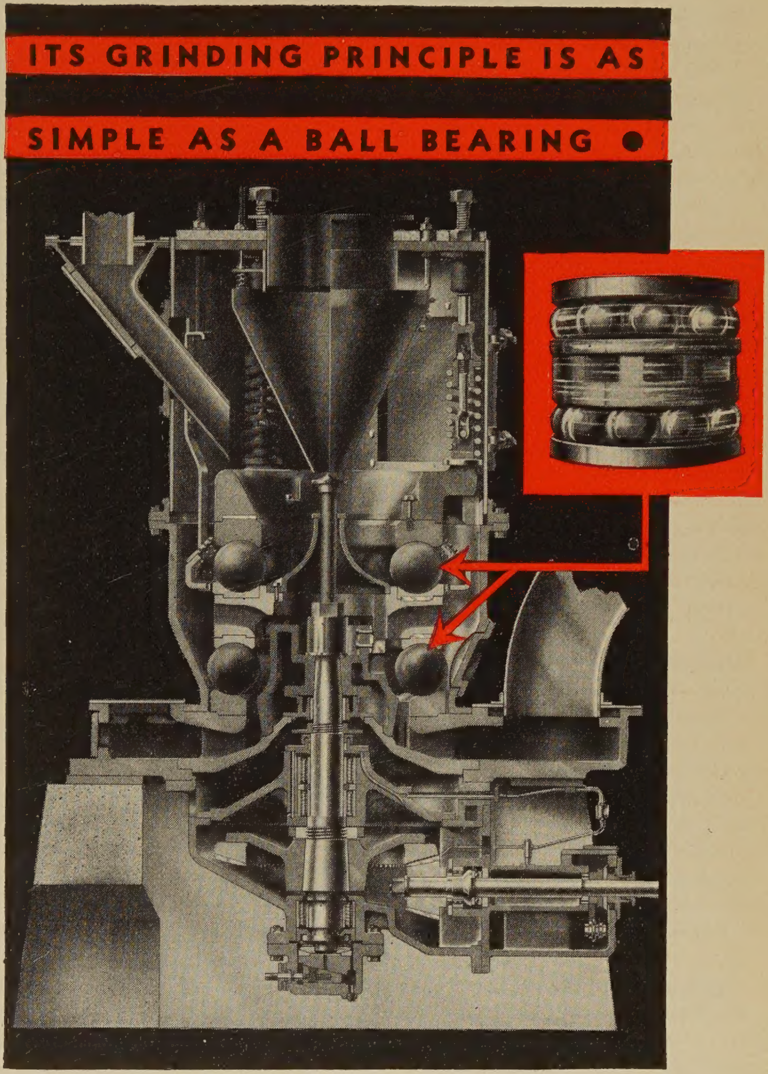
The new

FULLER LEHIGH Type B PULVERIZER

Sets new standard of Pulverizer Performance

THE PULVERIZER THAT MEETS THESE SPECIFICATIONS

1 Small floor space for given output.
2 Constant speed motor drive.
3 Low power consumption.
4 Power varying with rate of coal feed.
5 No lubrication within grinding zone.
6 Grinding zone sealed from parts requiring lubrication.
7 Smooth running and quiet.
8 Grinding pressure independently applied and not dependent on speed of mill.
9 Wide operating range—full capacity to the minimum permitted by the burners.
10 Responds quickly, but not too quickly, to change in rate of coal feed.
11 No metal-to-metal abrasion of grinding parts.
12 Fineness not affected by wear of grinding parts.
13 Fineness always under control.
14 Pulverize coal of any hardness or grindability.
15 Maintenance exceptionally low.



ITS GRINDING PRINCIPLE IS AS SIMPLE AS A BALL BEARING ●

THE urgent need for a better and a more efficient pulverizer is met by the new Fuller Lehigh Type B Pulverizer.

Its sturdy construction, simplicity of control with few adjustments for changing the output, makes it particularly well suited to serve both large and small direct-fired boilers, including those units which have rapidly fluctuating industrial loads. The mill is equally well adapted to the requirements of the storage system.

There is a size Type B Pulverizer for practically every requirement. Let a Fuller Lehigh Engineer tell you what this mill can do for you.

May we send you a copy of Bulletin 5-80 which describes this mill?

FULLER LEHIGH COMPANY, FULLERTON, PENNA., A Babcock & Wilcox Organization

FULLER LEHIGH

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PULVERIZED-COAL EQUIPMENT ⁘ WATER-COOLED FURNACE WALLS

About Manufacturers of Equipment

INDUSTRIAL LITERATURE

New Gear Catalog

The new 96-page catalog (*No. 30*) of small and medium size gears, issued by the *Ohio Gear Company*, Cleveland, O., is arranged with a view to giving as complete information as possible regarding the wide range of stock gears which the company manufactures, and to bring together in handy pocket-size form the formulas and information in the design and adaptation of gearing and reduction units of various types to meet particular requirements. Besides the usual tables of pitch, weights of round bars, etc., it includes a number of gear formulas not ordinarily given in catalogs; analyses of typical commercial alloy steels, and a simple method for figuring weights of triangular octagonal and other sectioned bars of various materials. Several new speed-reducer types are also described and listed.

The firm also issues a monthly bulletin showing the prices and details of all gears ready for immediate shipment.

"Better Small Pumping Unit"

Type SSU Centrifugal pumping units are described in *Bulletin No.* 1647 published by the *Allis-Chalmers Manufacturing Company*, Milwaukee, Wis.

Featured as "The Better Small Pumping Unit," its features are described and installations are shown. Sectional views, diagrammatic illustrations, head capacity tables and curves, and construction details are included.

Quarrying Machine Parts

Illustrations of stone quarrying machine parts occupy 2 pages of the November issue of *The Amsco Bulletin*, published by the American Manganese Steel Company, Chicago Heights, Ill. Amsco units are shown separately as well as installed.

The bulletin contains in addition several brief articles of interest.

Diamond Catalog

A new catalog of belting, packing, hose, matting and miscellaneous items manufactured by the *Diamond Rubber Co., Inc.*, of Akron, Ohio, for industrial use is just off the press.

An interesting feature of the publication is that the cover and mailing envelope were printed from rubber engravings, hand-cut from sheet rubber manufactured by the Diamond company.

Copies of the catalog pages have also been specially produced of correct size and shape for inclusion in loose leaf catalogs carried by distributors' salesmen.

Ross Feeder Booklet

The Ross feeder, a curtain of heavy endless steel chain, for use in both primary and secondary crusher operations, is described in a 20-page publication.

Several pages are devoted to descriptions and photographic illustrations of the behavior and control of materials, chief applications, and some typical installations. The latter are also shown by means of diagrams.

The feeder is a product of the *Ross Screen and Feeder Company*, New York City and London, England.

Hytork Motors

Hytork synchronous motors are described in *Bulletin* 1150 issued recently by the *Allis-Chalmers Manufacturing Company*, Milwaukee, Wis.

The Hytork motor is defined as a machine designed to combine the starting characteristics of the ordinary slip-ring induction motor with the running characteristics of the synchronous motor.

Numerous installations, several of them in cement plants, are shown.

Promal Chain Book

Link-Belt Company, Indianapolis, Indiana, has issued a 32-page comprehensive data book devoted to *Promal* chains. Promal is Link-Belt's new, stronger, longer wearing metal for cast chains, for power transmission and conveying services.

This new book, *No. 1050*, describes Promal chains, both plain links and attachments, for use where the inherent qualities of Promal are desired. Dimensions, strengths, list prices and weights, are given in this data book.

G-E Motors Leaflet

A new four-page loose-leaf insert just published by the *General Electric Company*, Schenectady, N. Y., is that on low-speed synchronous motors, Types TS and QS. This is publication *GEA-529A* and covers motors for direct connection to reciprocating compressors.

Cub Conveyor

The Link-Belt Company has just issued a folder, *No.* 1248, describing its *Cub* portable belt conveyor.

The contents of this folder comprise a description of the machine, its parts, and a list of industries in which this type machine has been used for handling various materials at low cost.

Illustrations of these machines at work under many conditions are shown, along with complete specifications of this loader.

Copies are available upon request to the nearest Link-Belt office.

FIELD ACTIVITIES

Link-Belt Foundry

Contract for the construction of a powdered coal system at its Indianapolis foundry entailing an expenditure of $125,000 has just been awarded by the Link-Belt Company. Preparation for future business was given as the reason for adding this equipment at the present time.

This system will modernize the process of firing the melting and annealing furnaces and the heating of the boilers.

Fuller Office

The Fuller Company, Catasauqua, Pa., has opened an office at 1118 Marquette Building, Chicago. The sales engineer in charge is J. M. Alonso.

B. L. Donahue C-H Manager

B. L. Donahue has been appointed manager of the Buffalo district office of *Cutler-Hammer, Inc.* He succeeds B. A. Hansen, resigned. Mr. Donahue has been connected with the Pittsburgh branch office of the company for the past eight years.

Fuller Lehigh Changes Cincinnati Office

According to a recent announcement, the *Fuller Lehigh Company*, Fullerton, Pa., announces the removal of its Cincinnati office on October 1st from the Traction Building to Carew Tower, Cincinnati, Ohio.

H. E. Martin will continue in charge as manager.

Link-Belt Promotes Maxwell

An announcement emanating from *Link-Belt Company*, Indianapolis, Indiana, states that *Warren Maxwell* has been appointed superintendent of their Dodge works to replace *F. J. Oakes*, deceased.

Mr. Maxwell joined the Link-Belt Company in 1922, entering their sales department. In January, 1929, he was made assistant superintendent, from which position he has just been promoted.